The aerodynamics of curved jets and breakaway in Coanda flares

Senior, Peter

The Aerodynamics of Curved Jets and Breakaway in Coanda Flares

Volume 2 of 2

Peter Senior

University of Durham
School of Engineering and Applied Science

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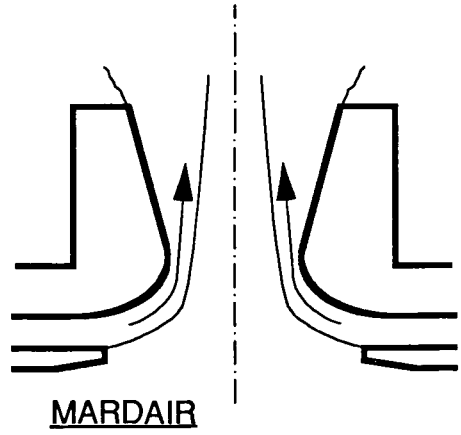

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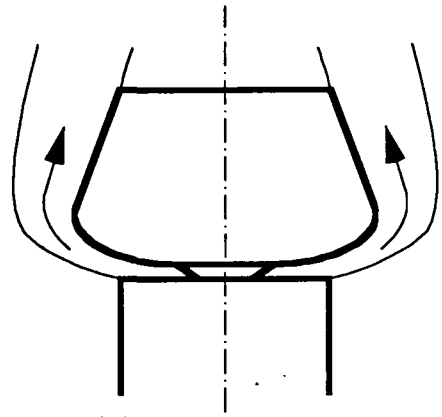

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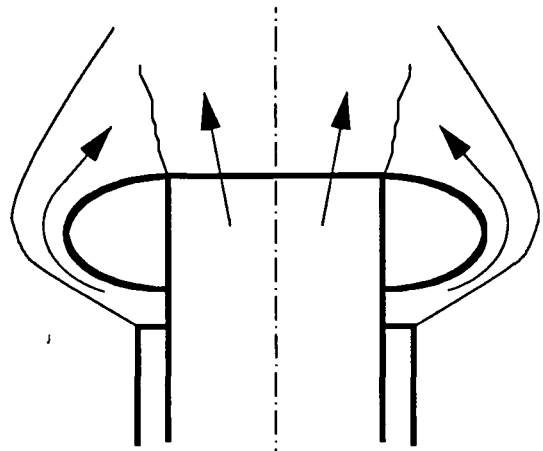


STEDAIR

Figure 1.1. Coanda Flare Variants

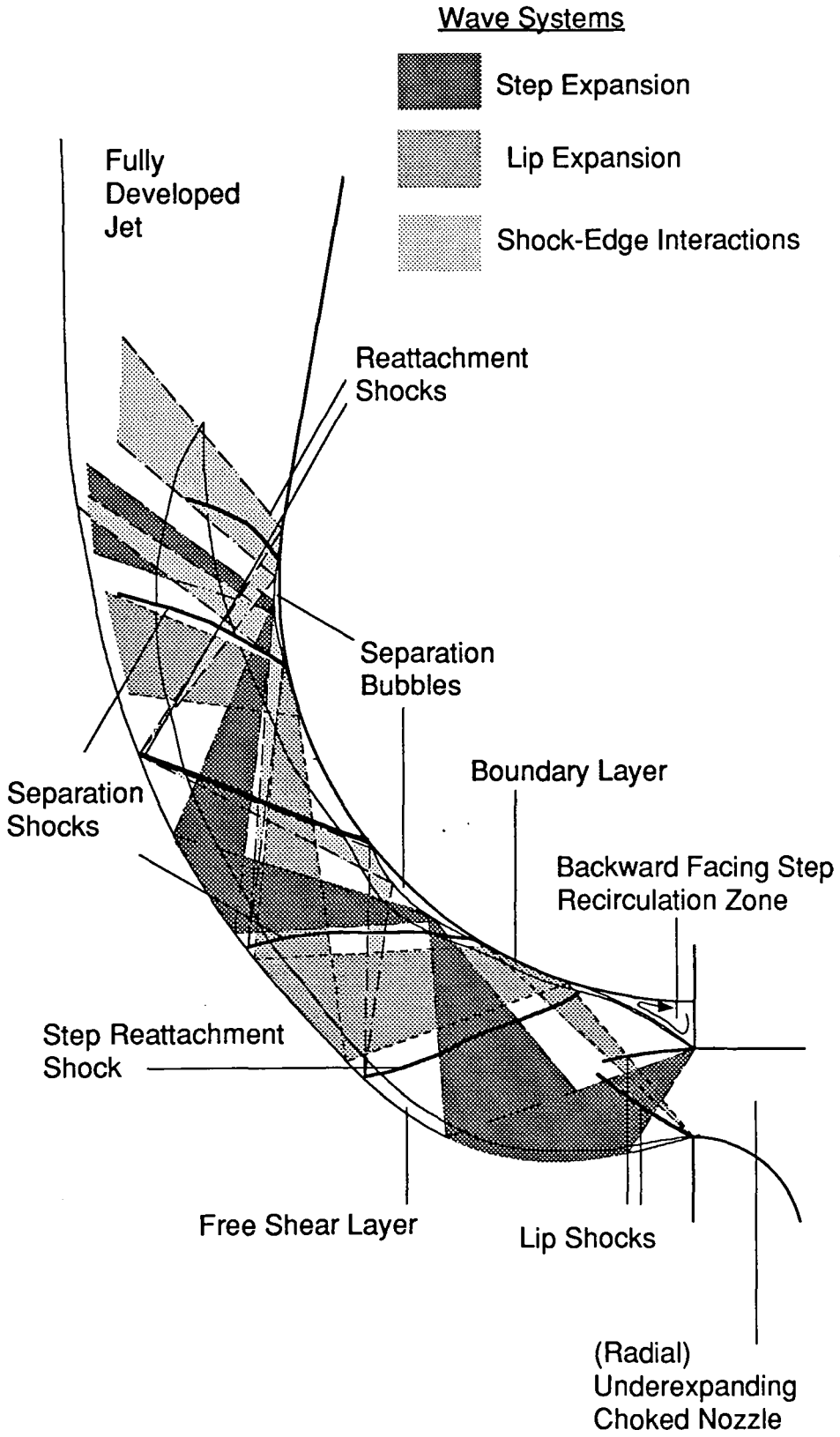
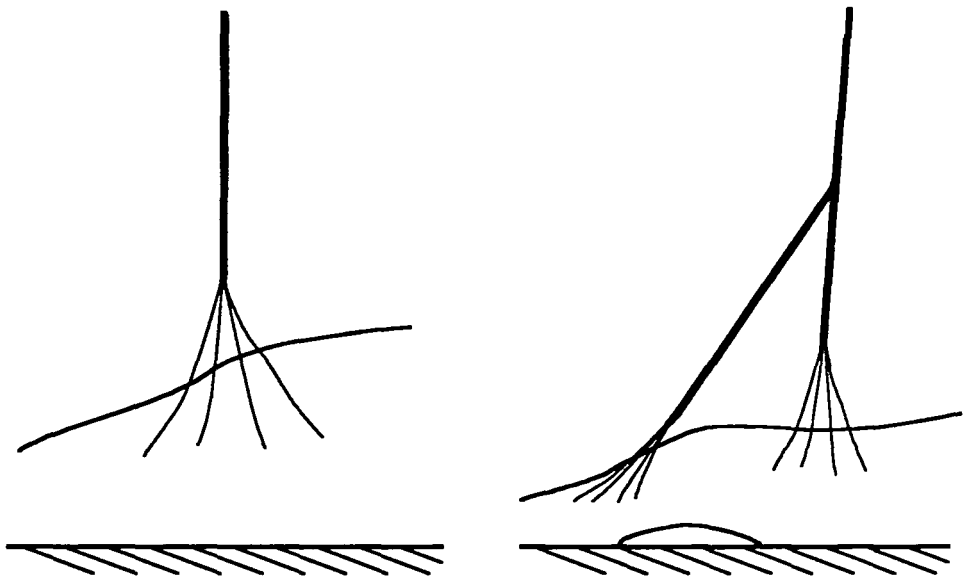
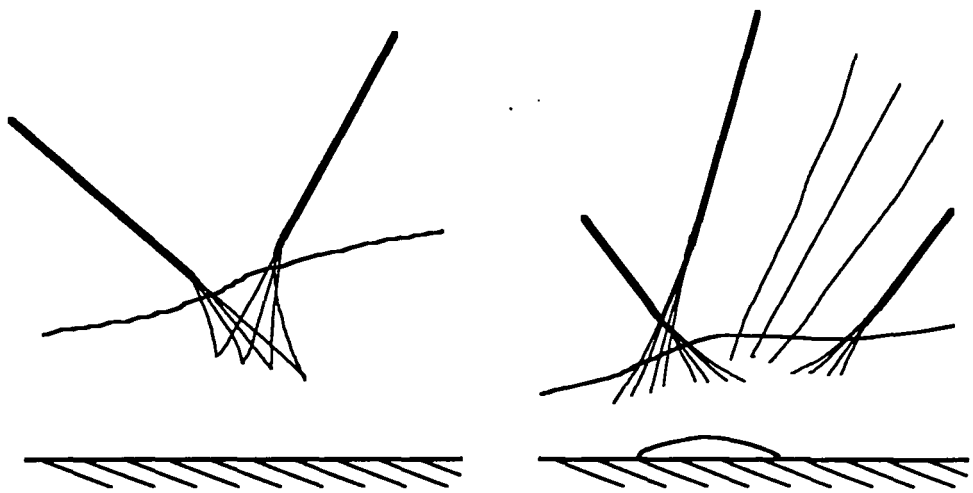


Figure 2.1. Coanda Flare Flowfield Schematic



a) Normal, Attached

b) Normal, Separated



c) Oblique, Attached

d) Oblique, Separated

Figure 2.2. Shock-Boundary Layer Interactions

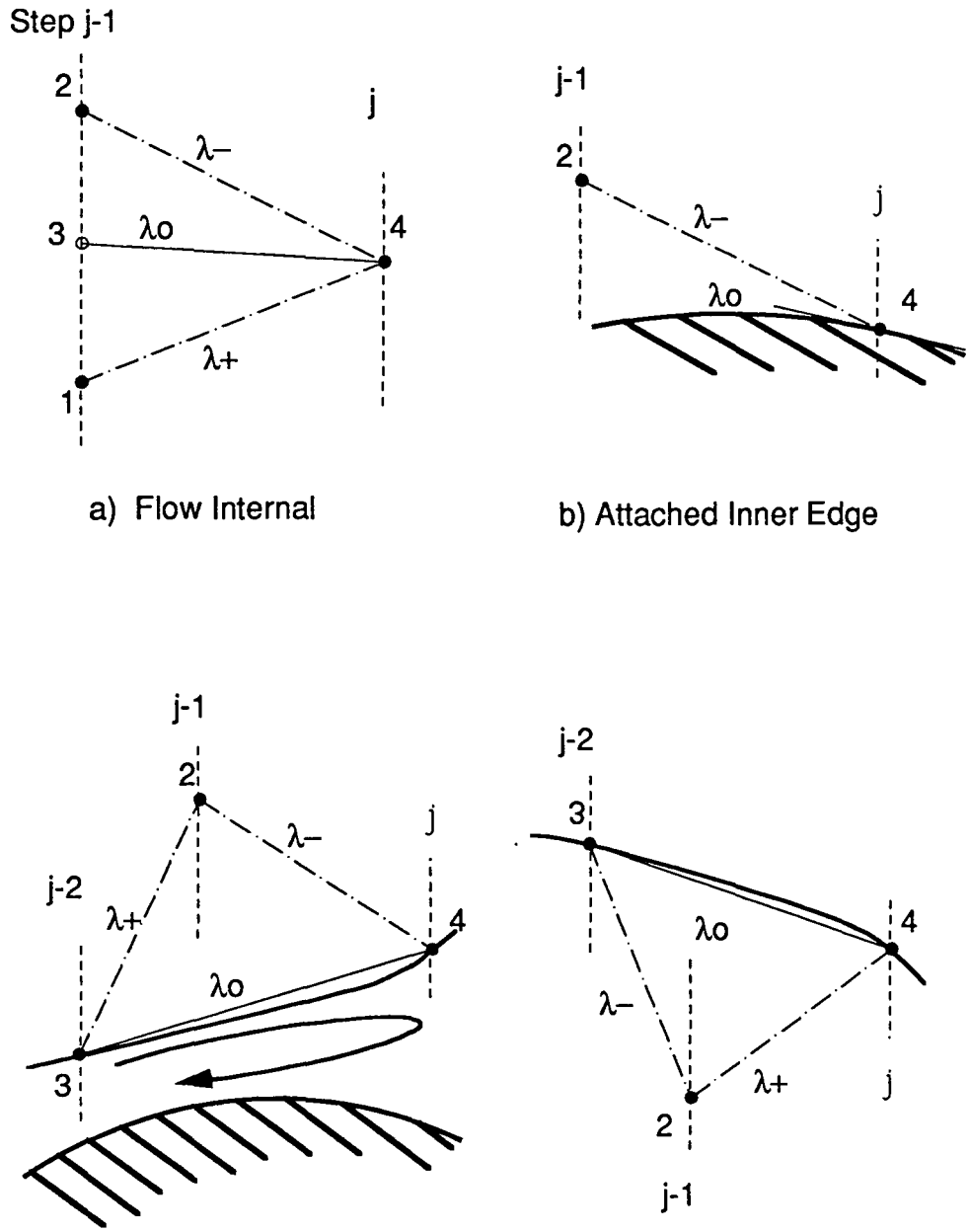


Figure 4.1. Method of Characteristics Unit Processes

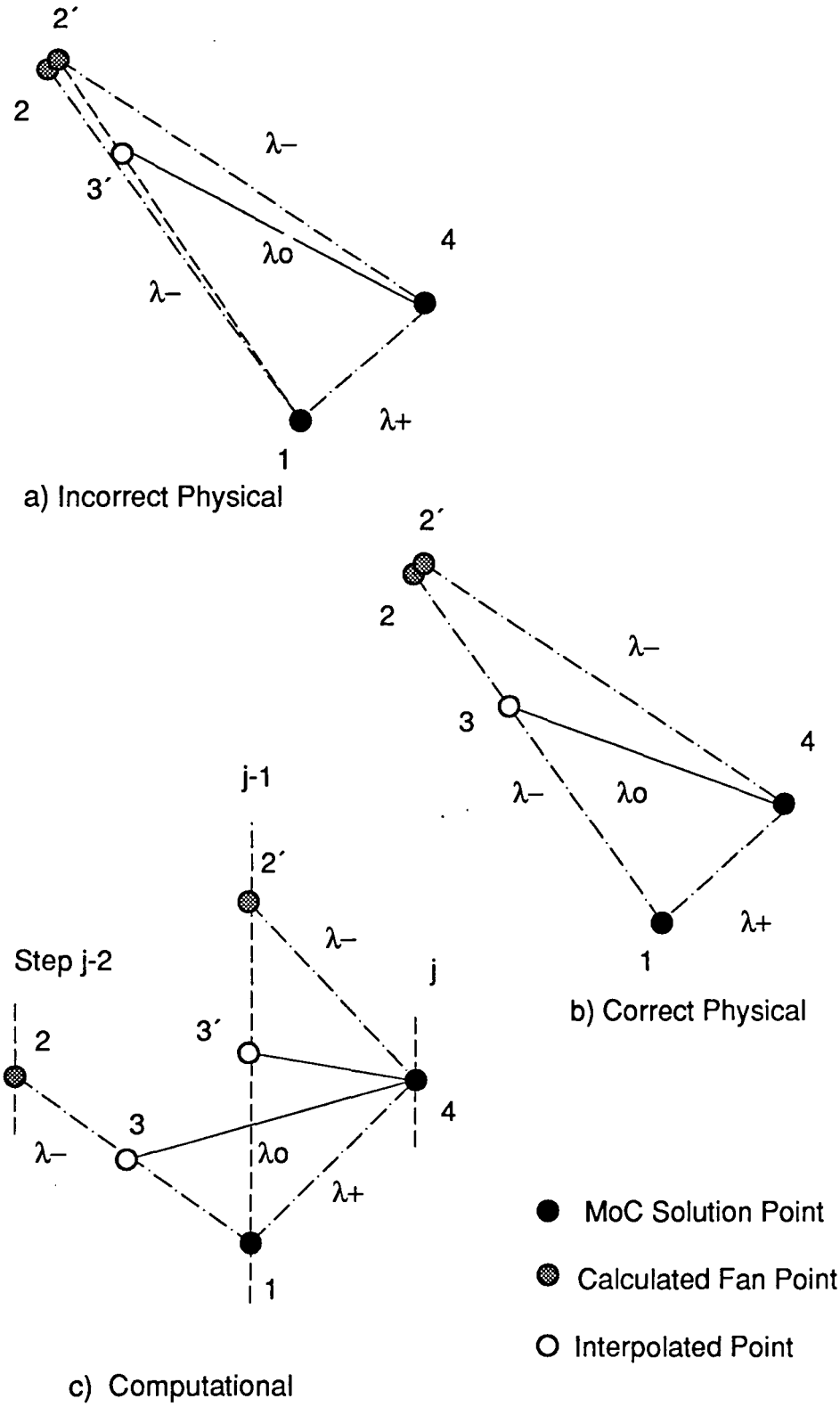


Figure 4.2. Expansion Corner MoC Unit Process

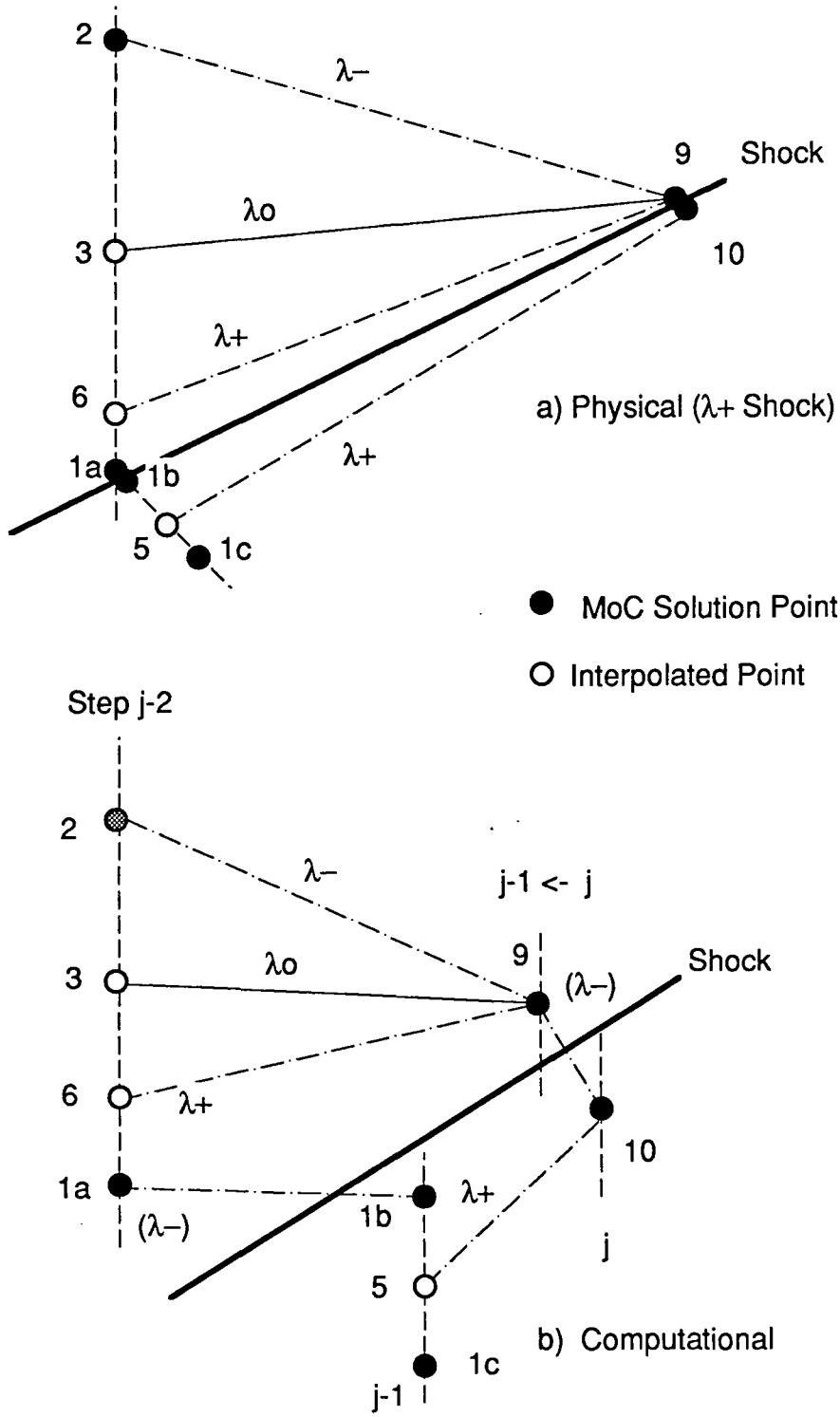
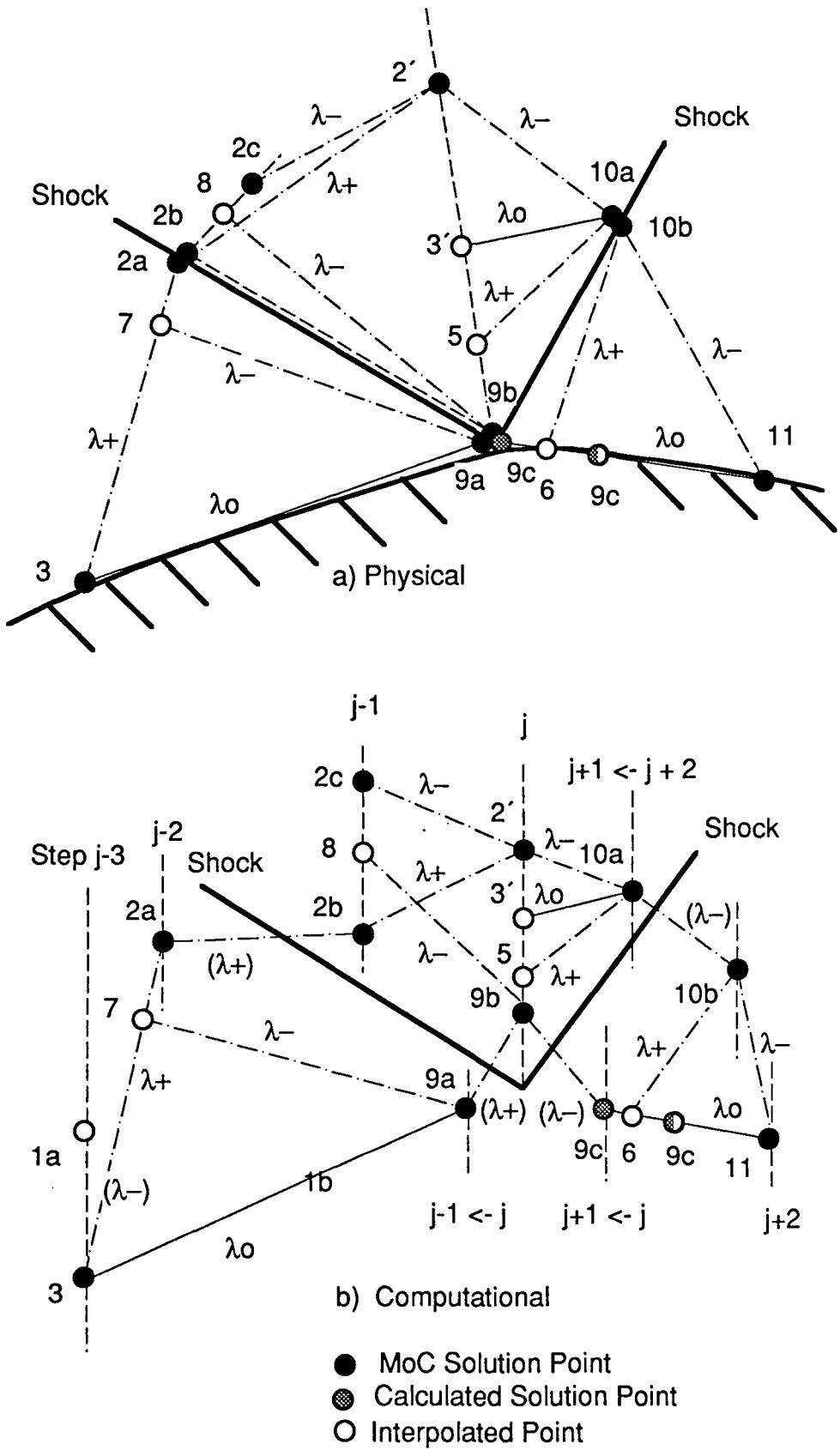


Figure 4.3. Shocked MoC Unit Process



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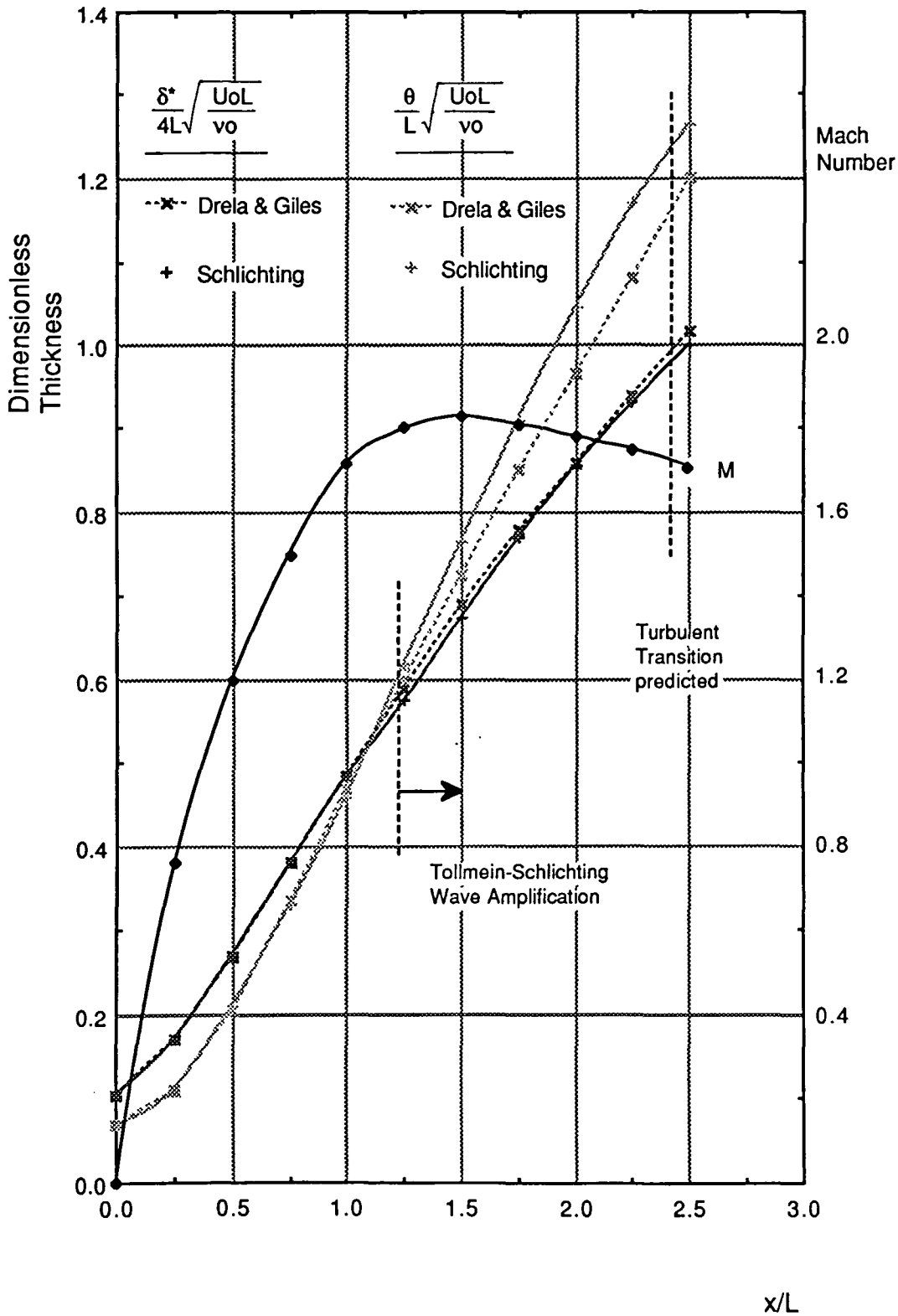

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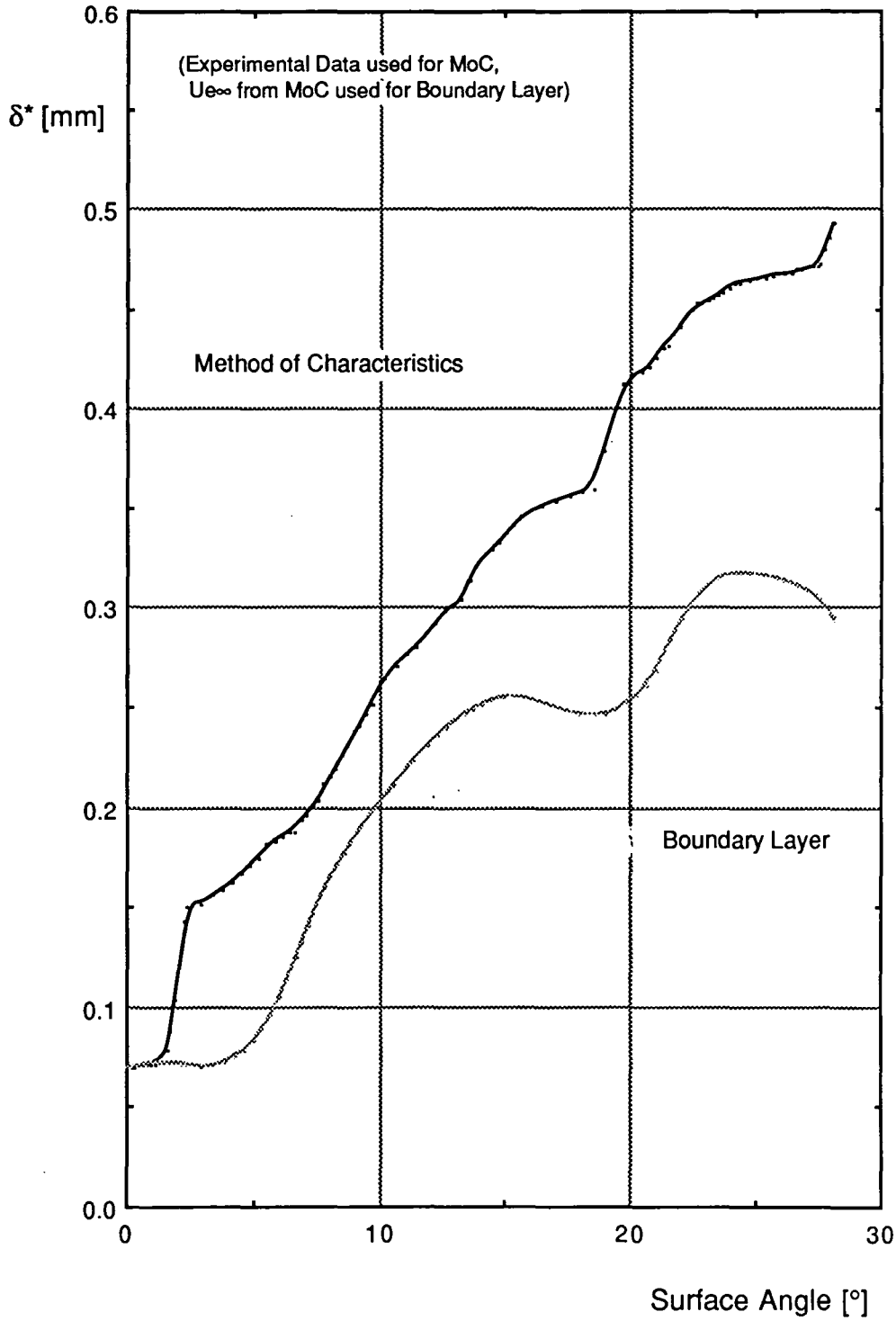

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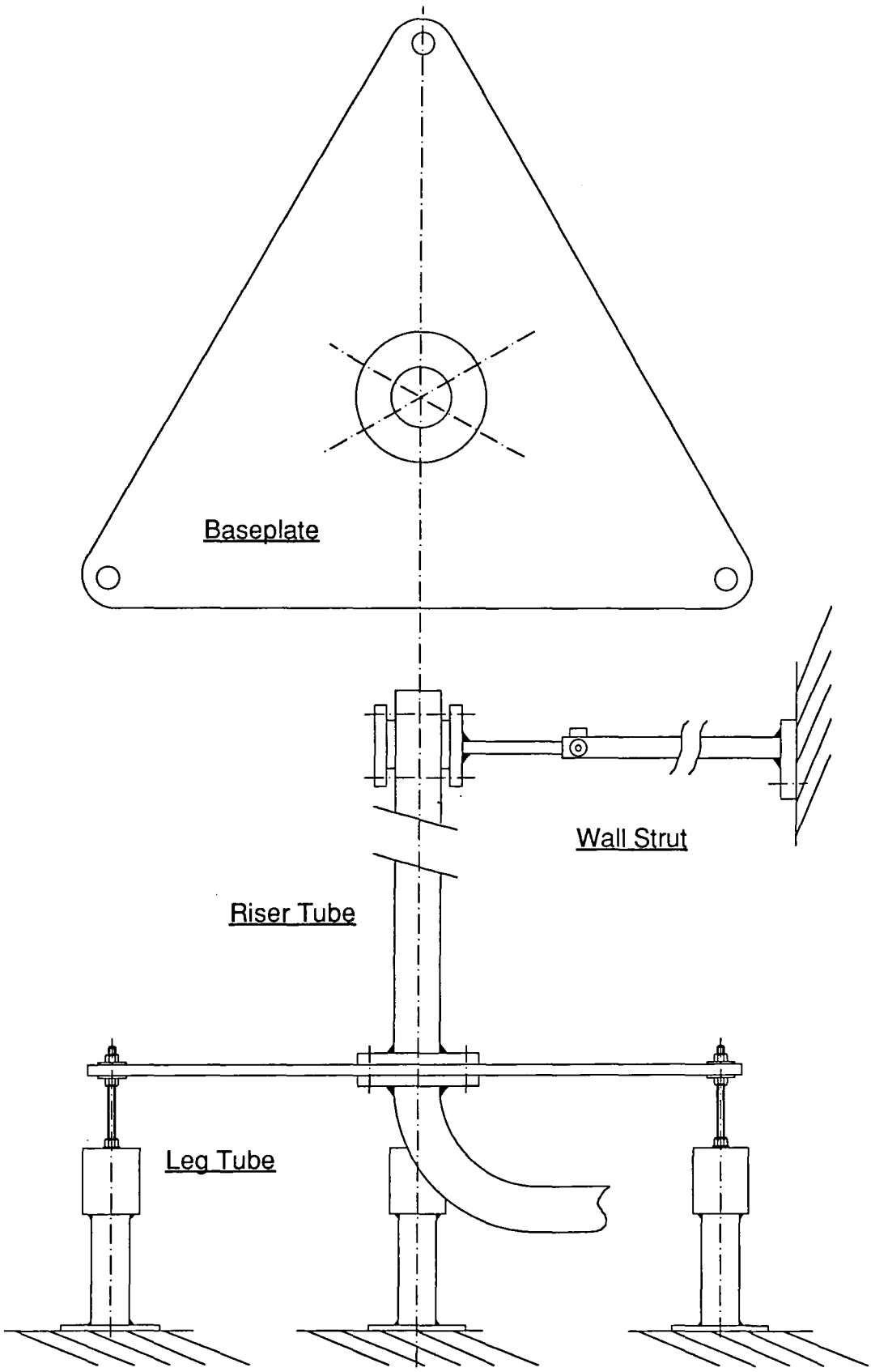

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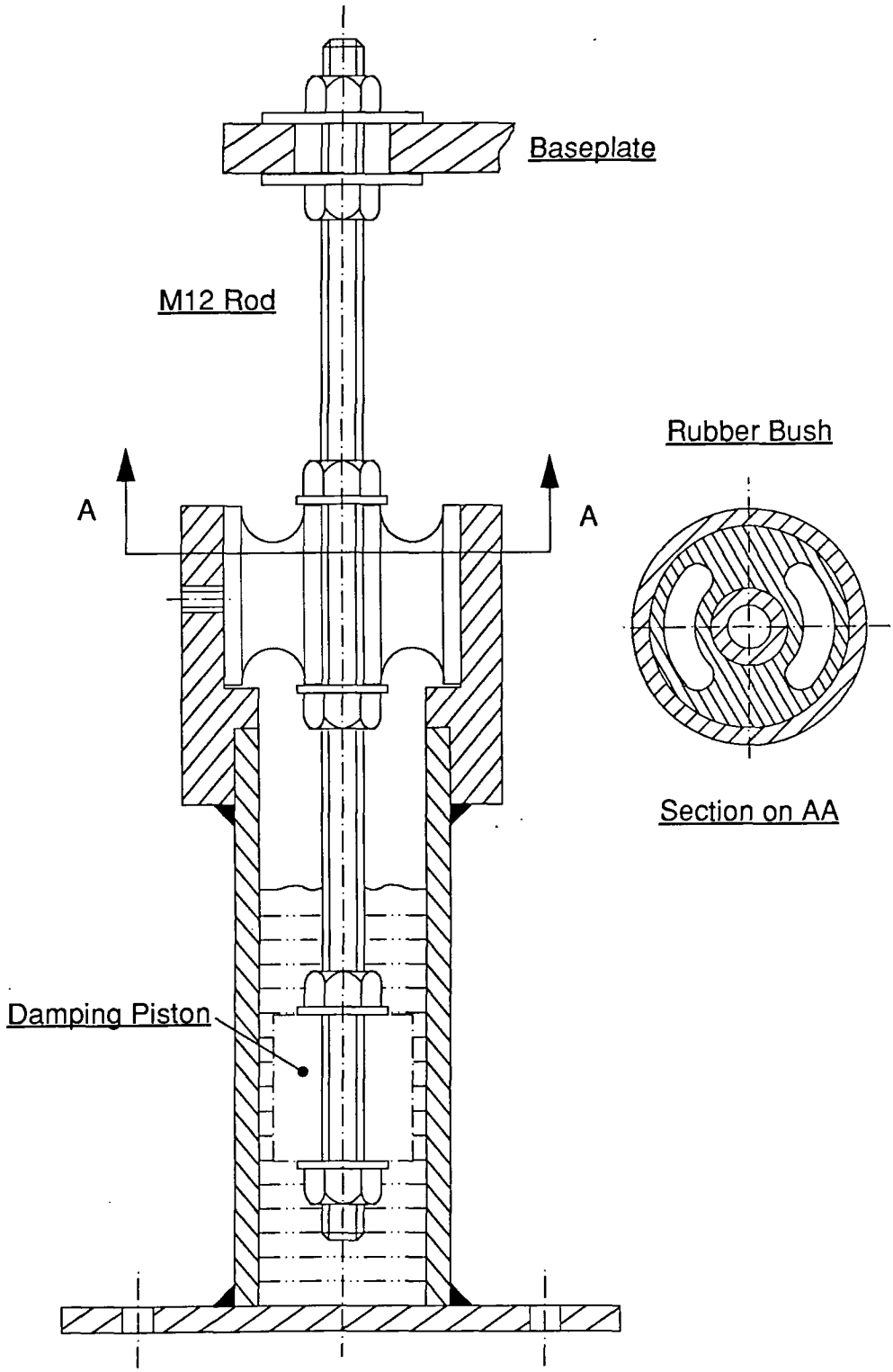

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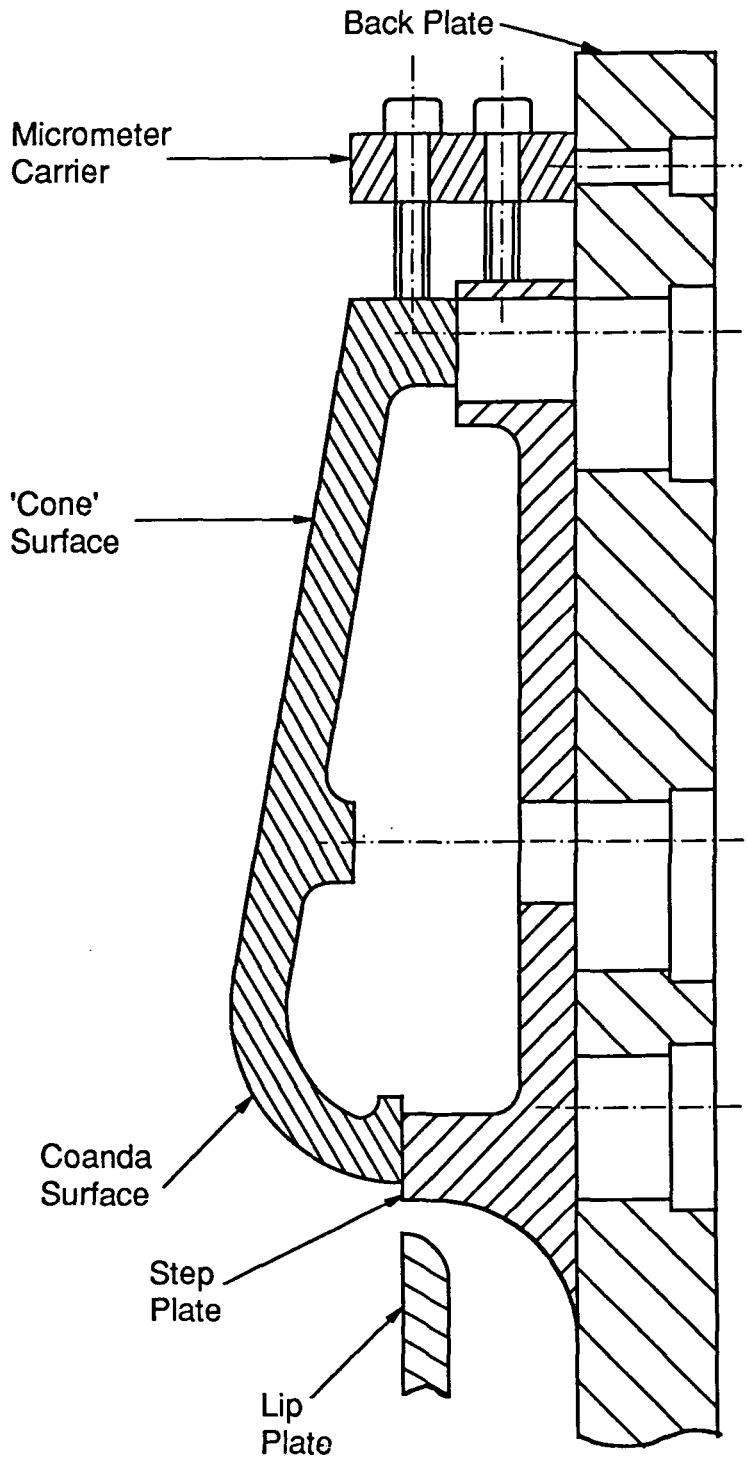

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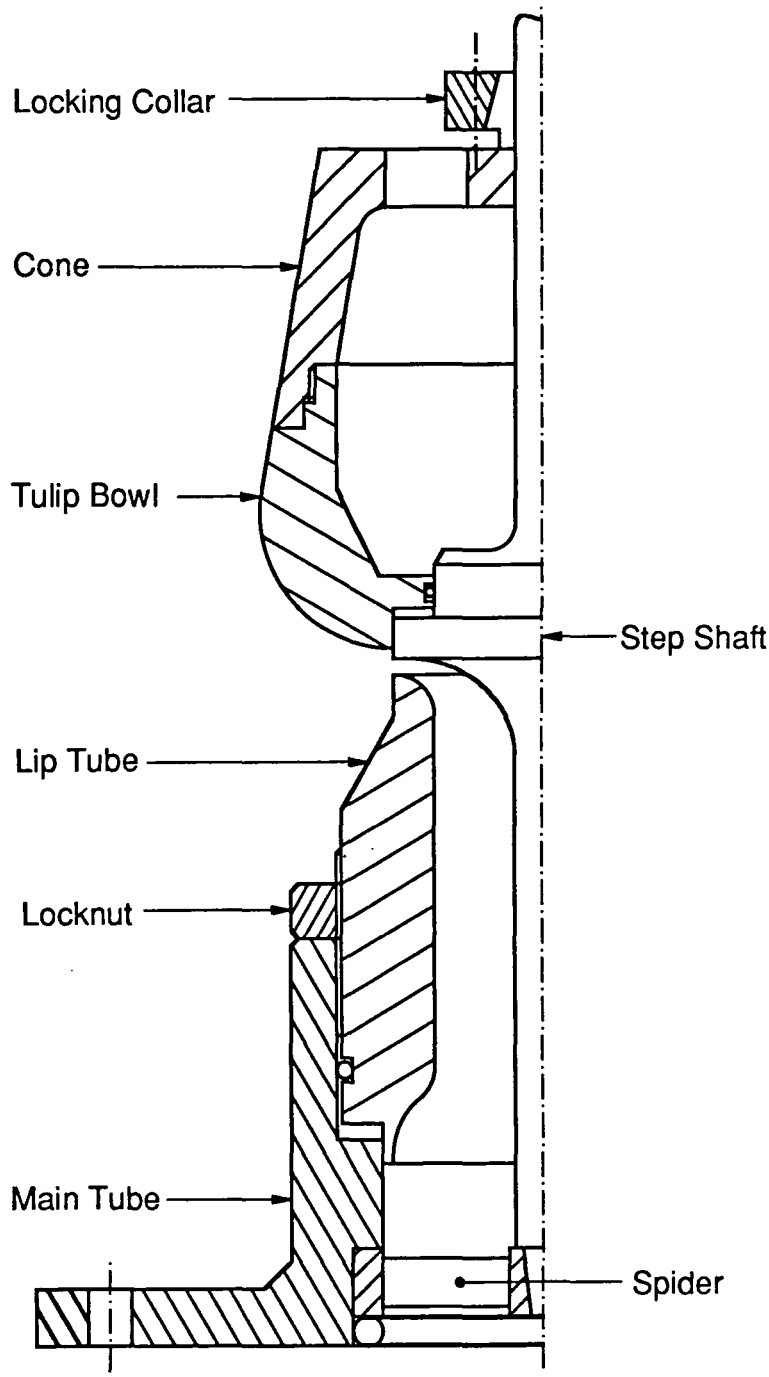

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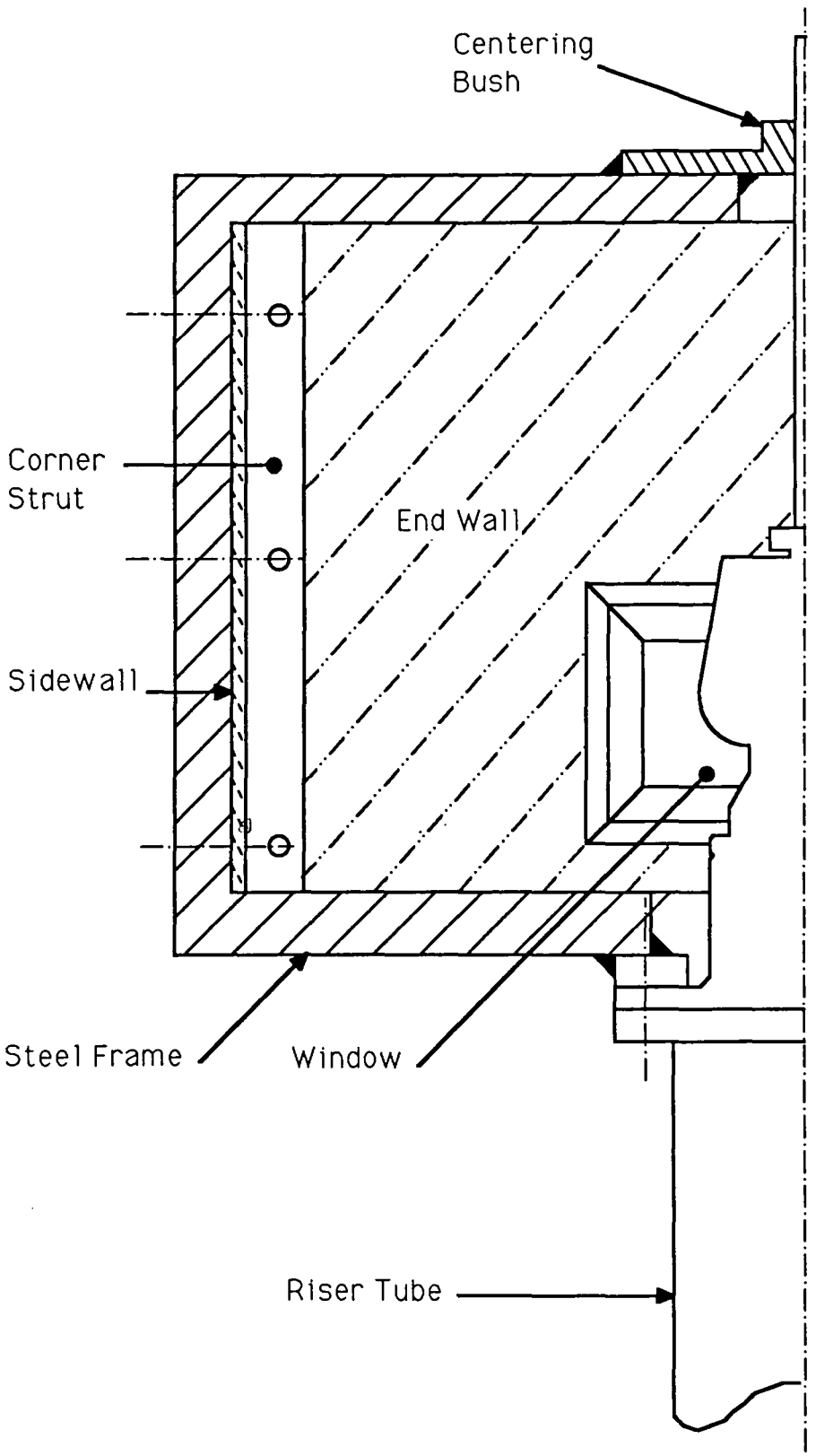

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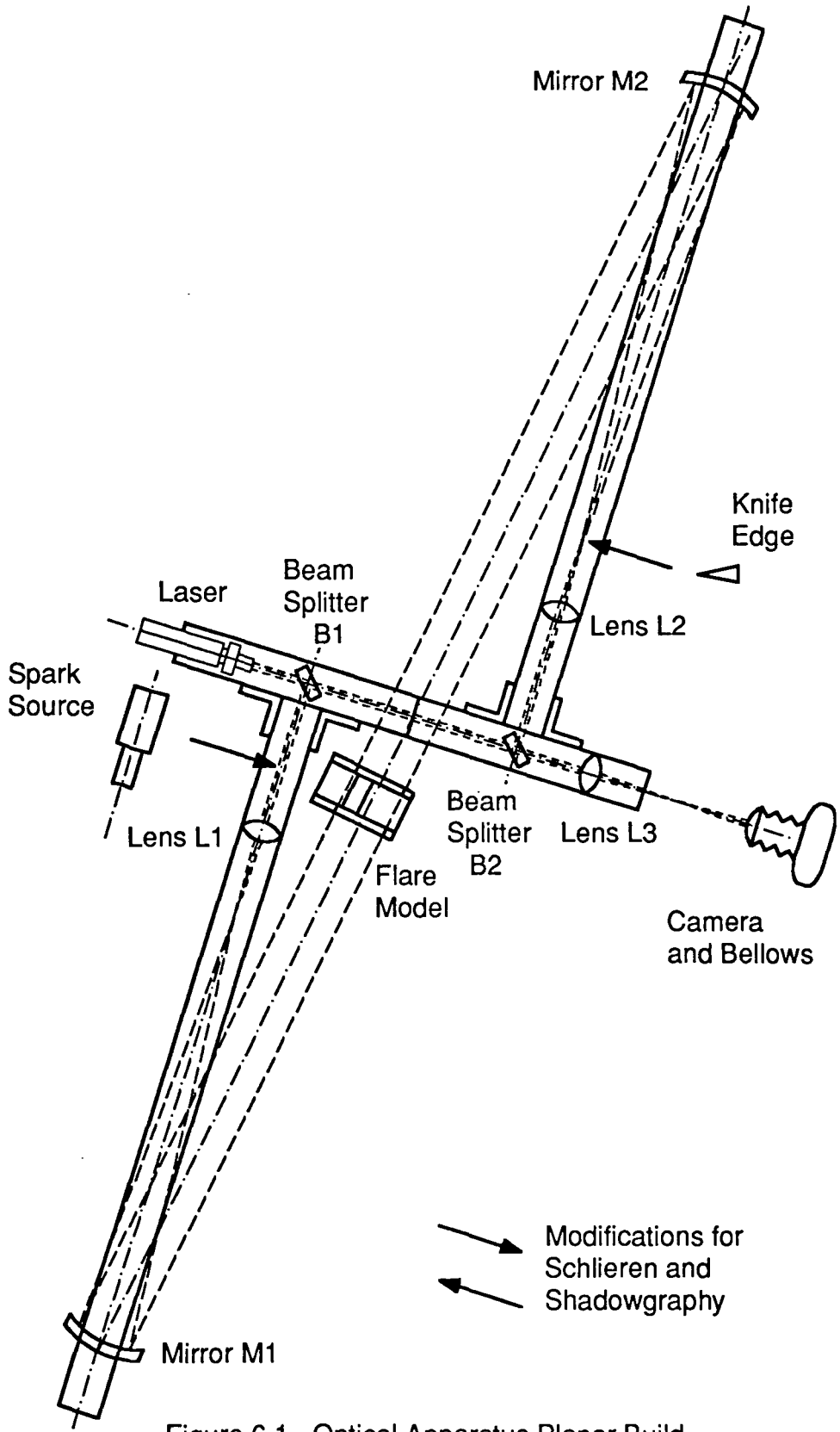

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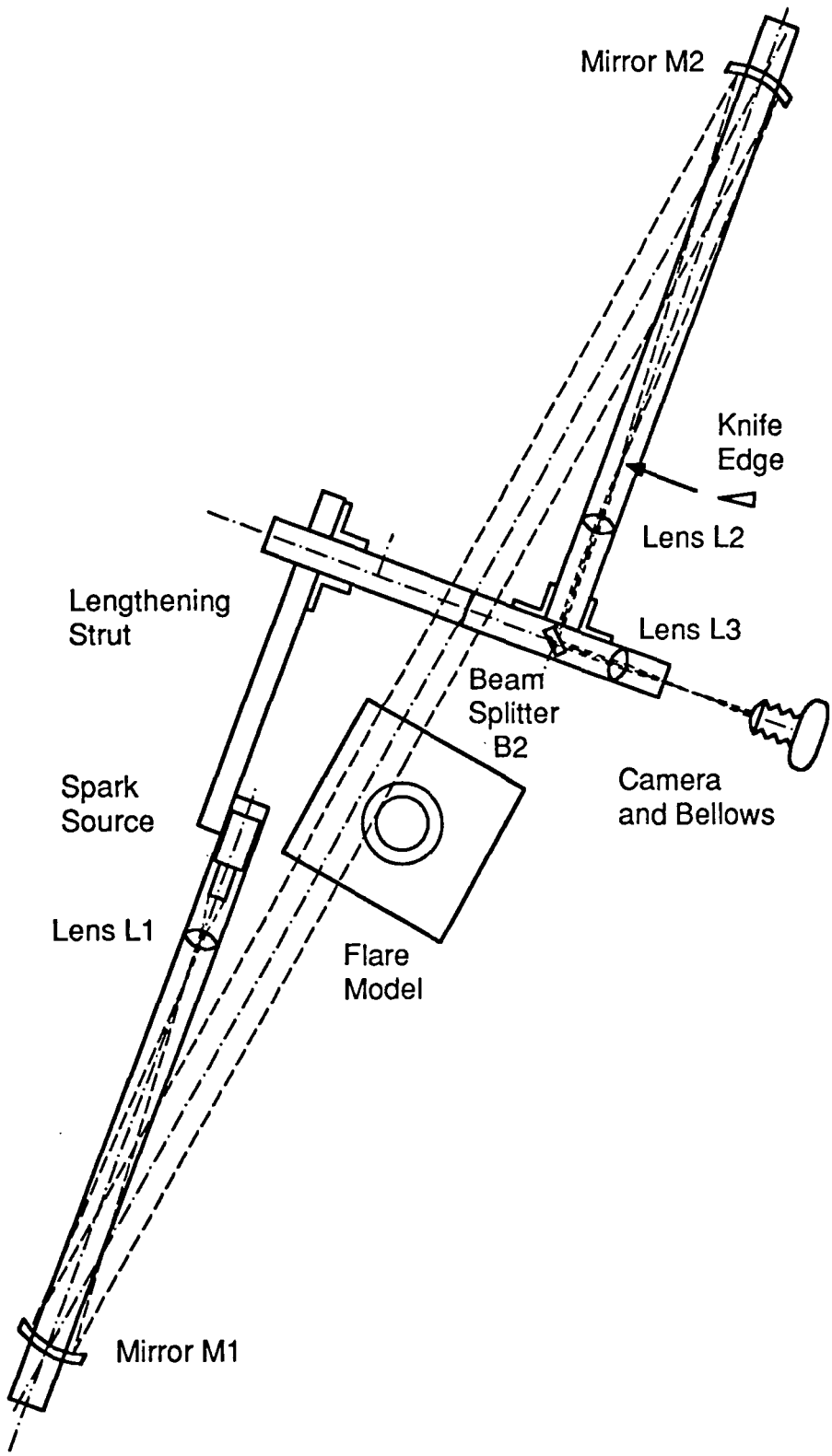
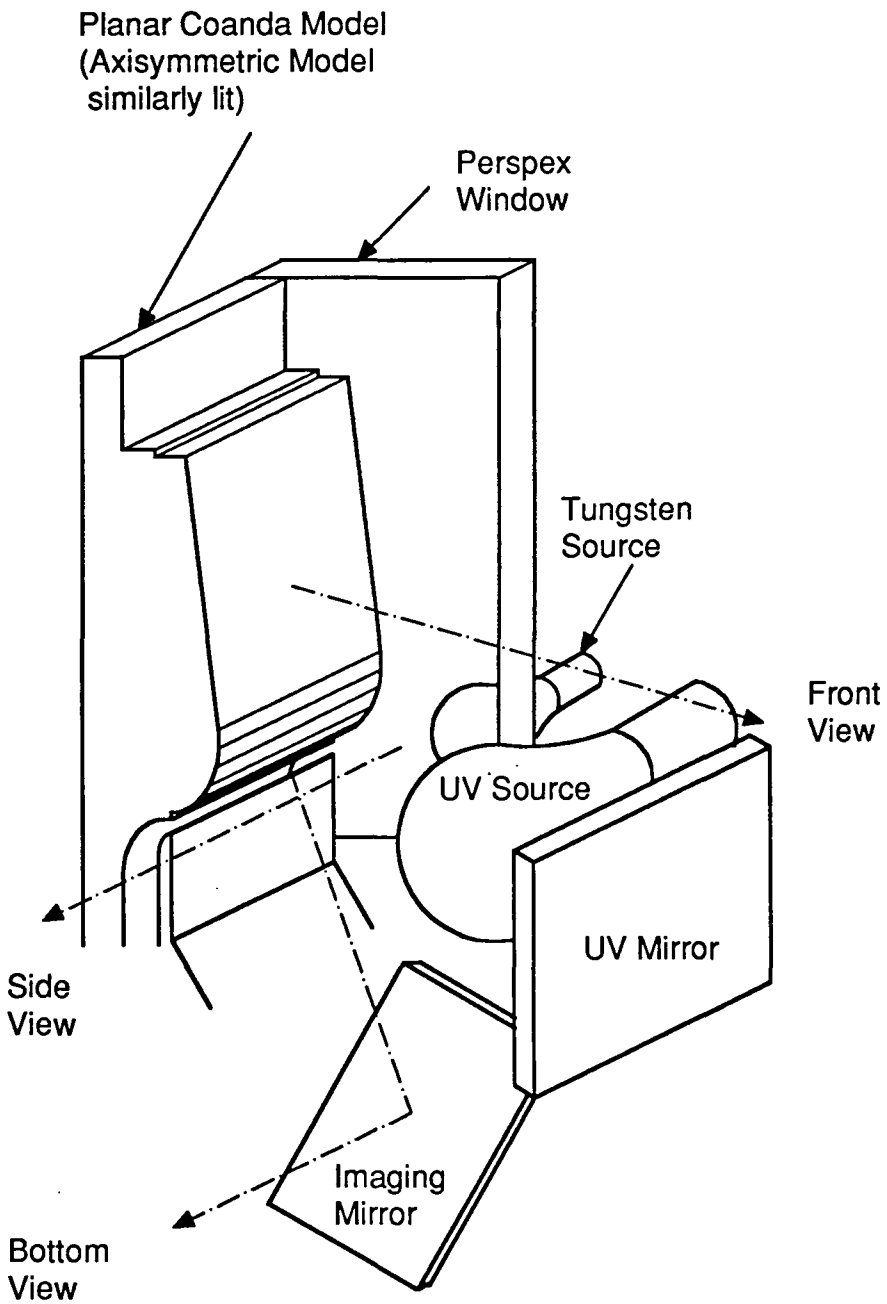


Figure 6.2. Optical Apparatus Axisymmetric Build



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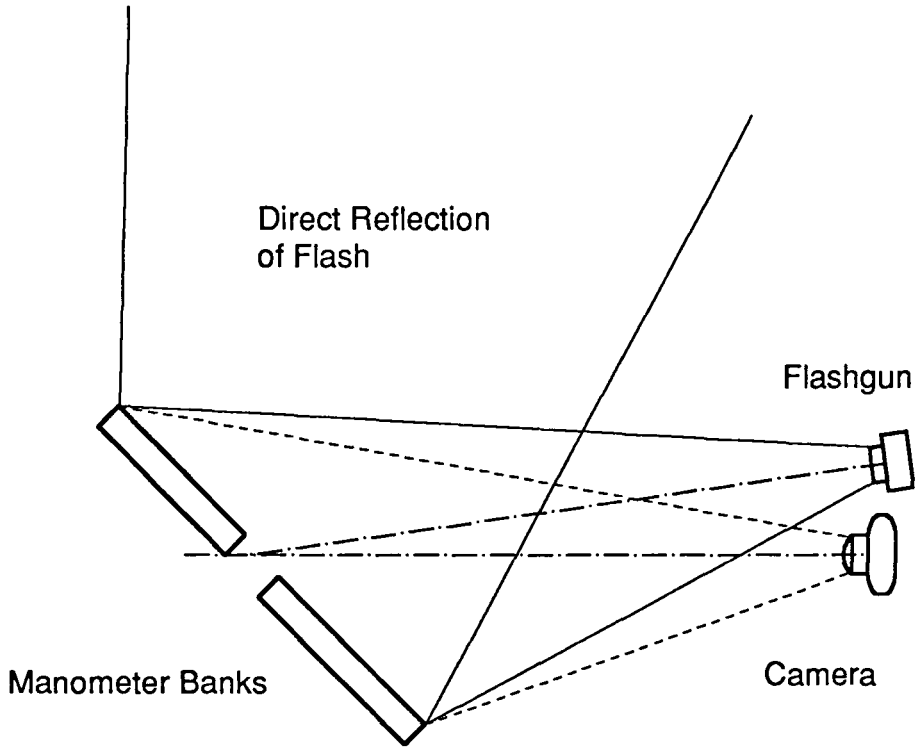

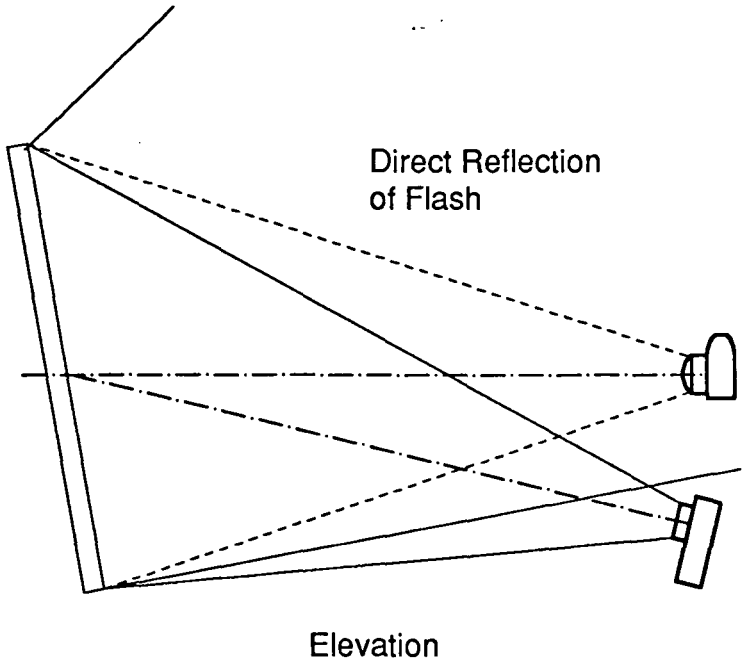

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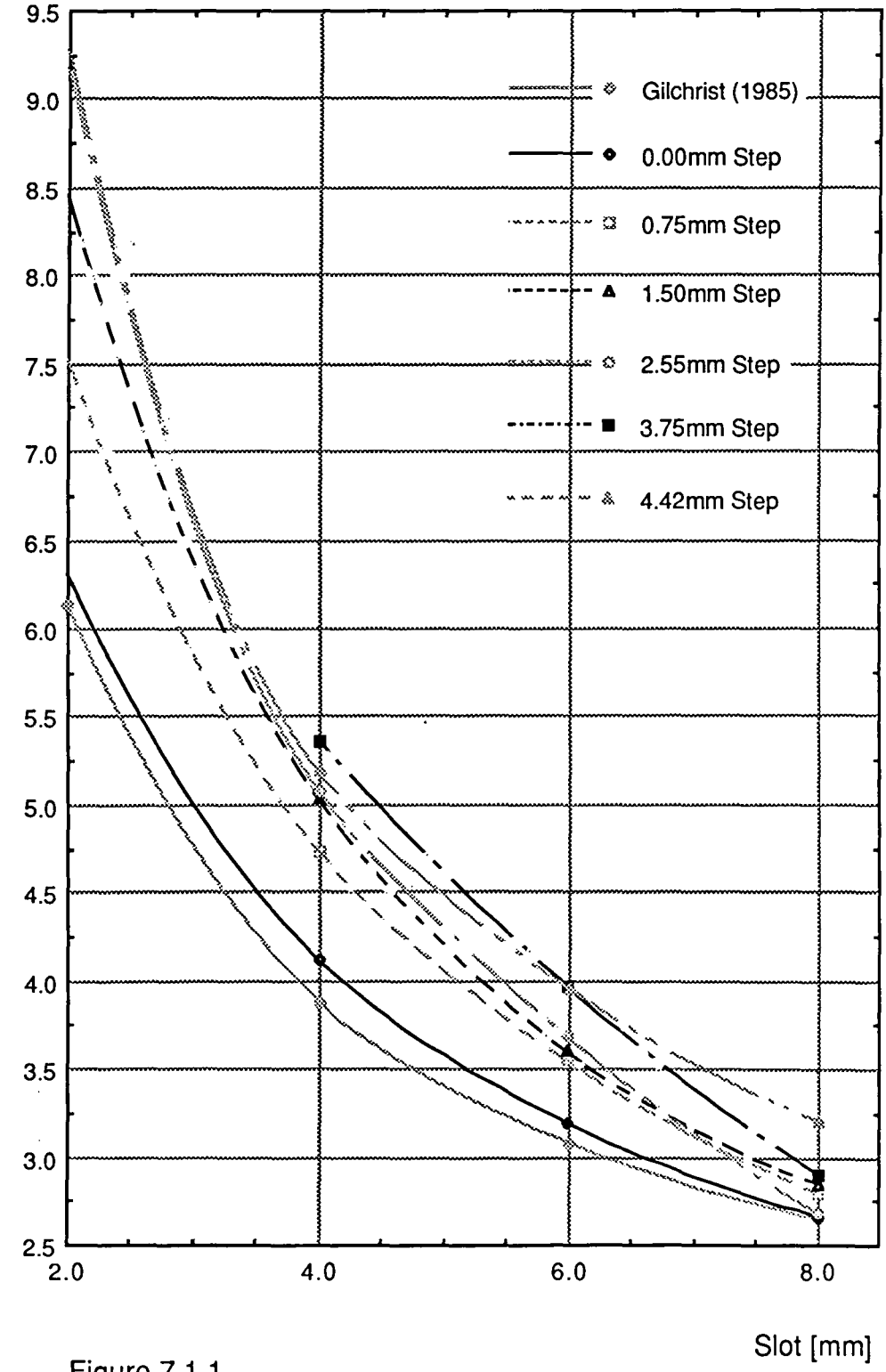
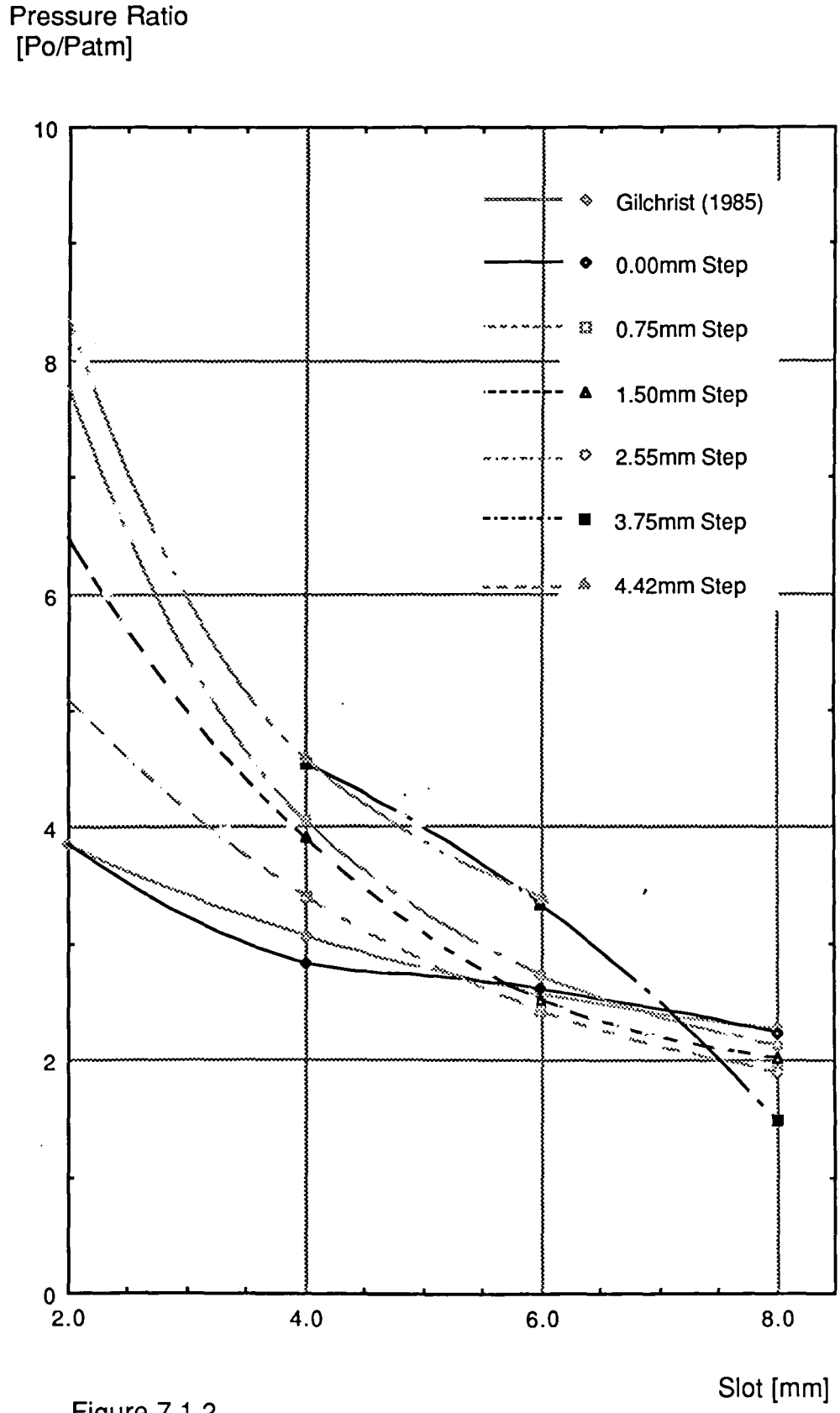


Figure 7.1.1.

Planar Coanda Model
Breakaway Behaviour



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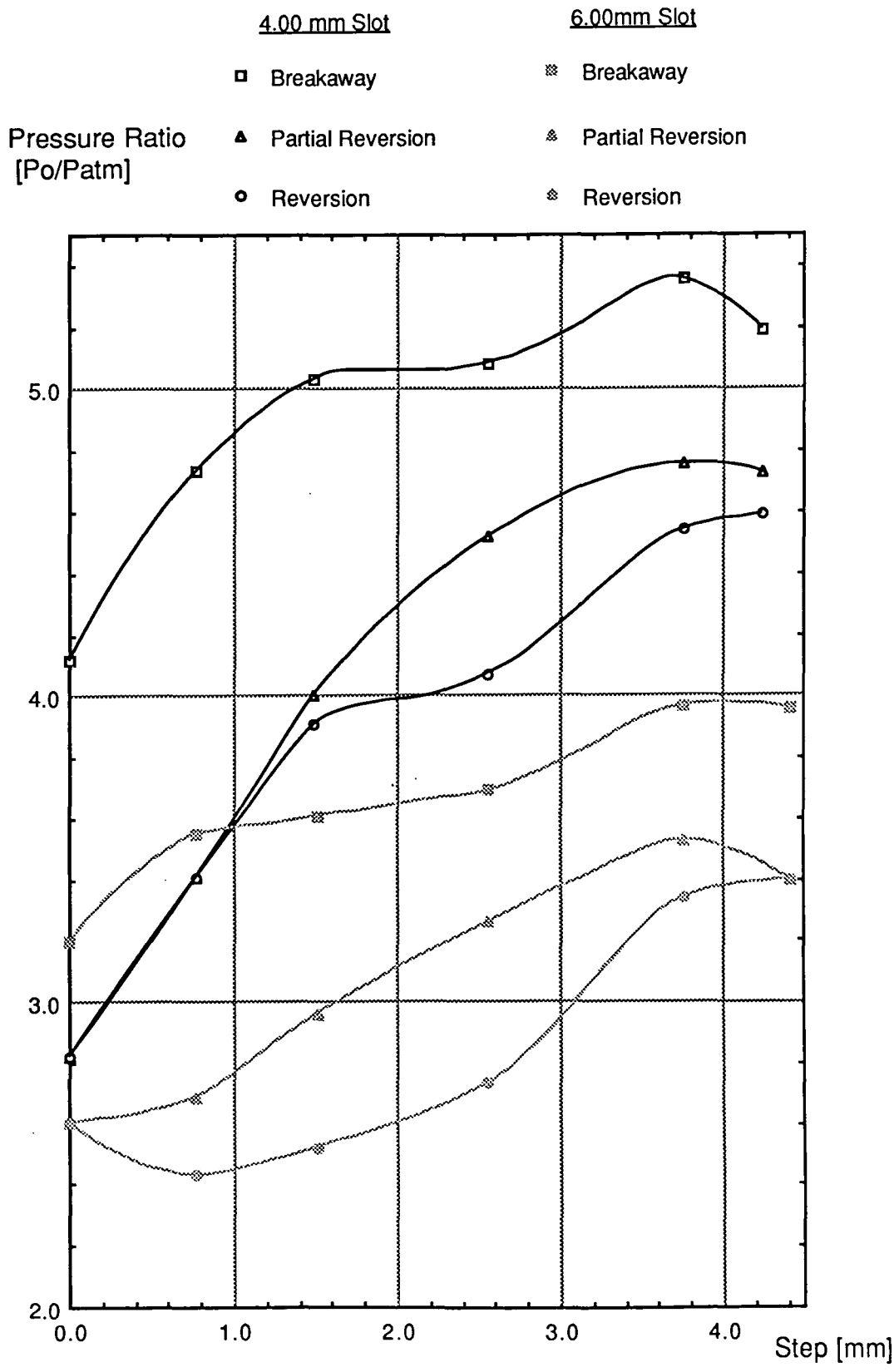
Planar Coanda Model
Reversion Behaviour



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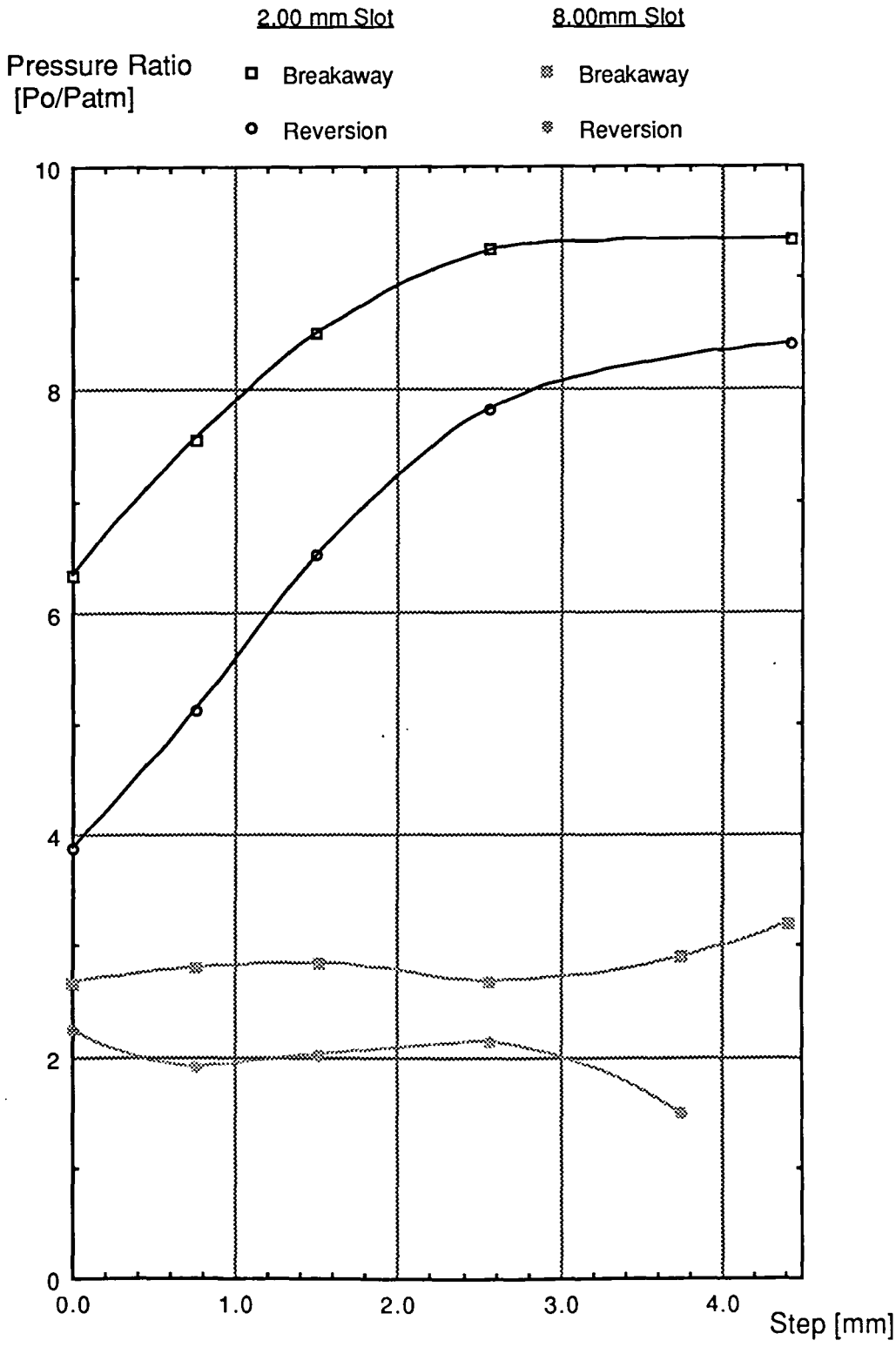

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Planar Coanda Model
Breakaway/Reversion Behaviour

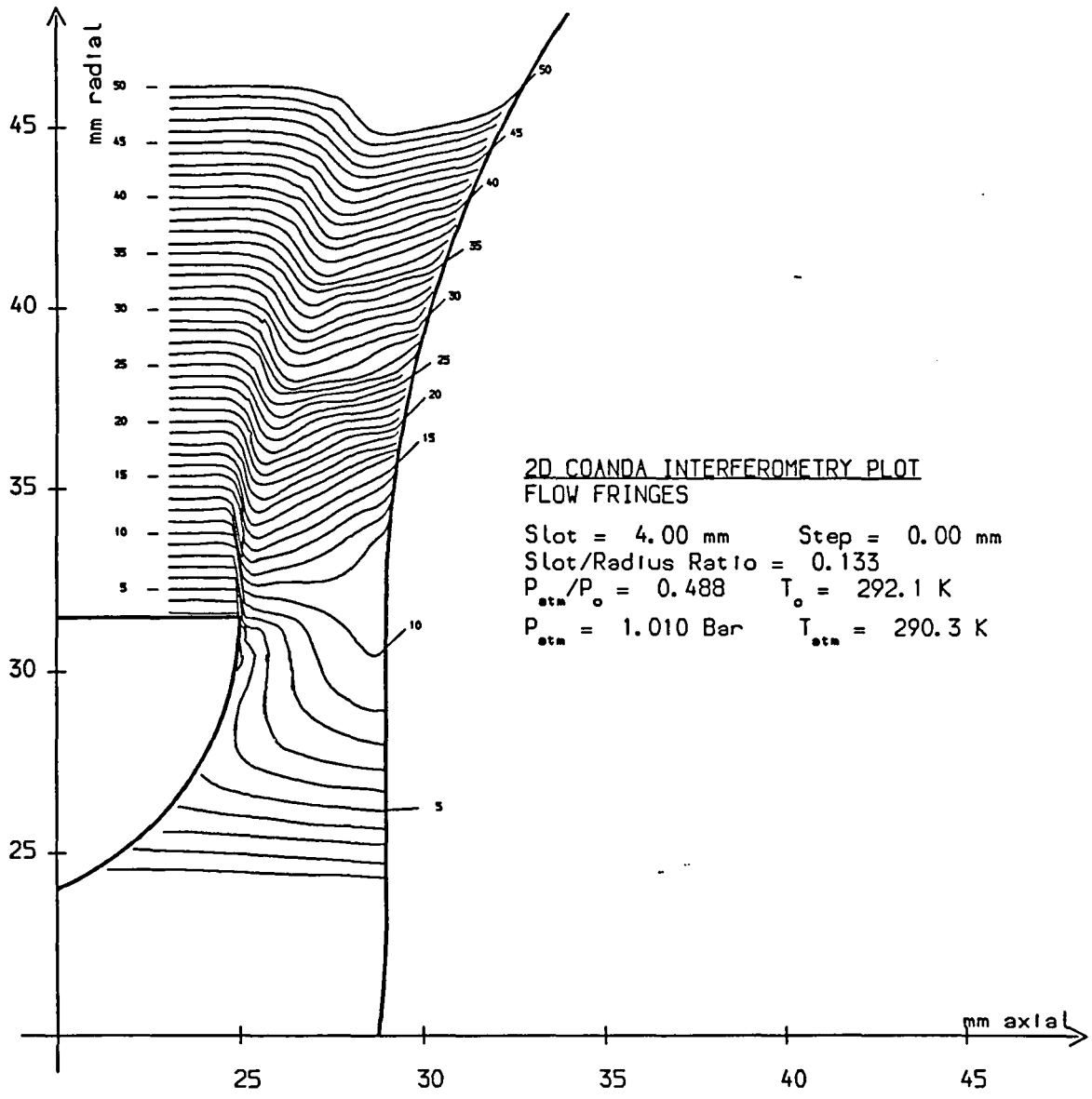

Figure 7.1.5 Interferometry Fringe Pattern -- Choking Conditions

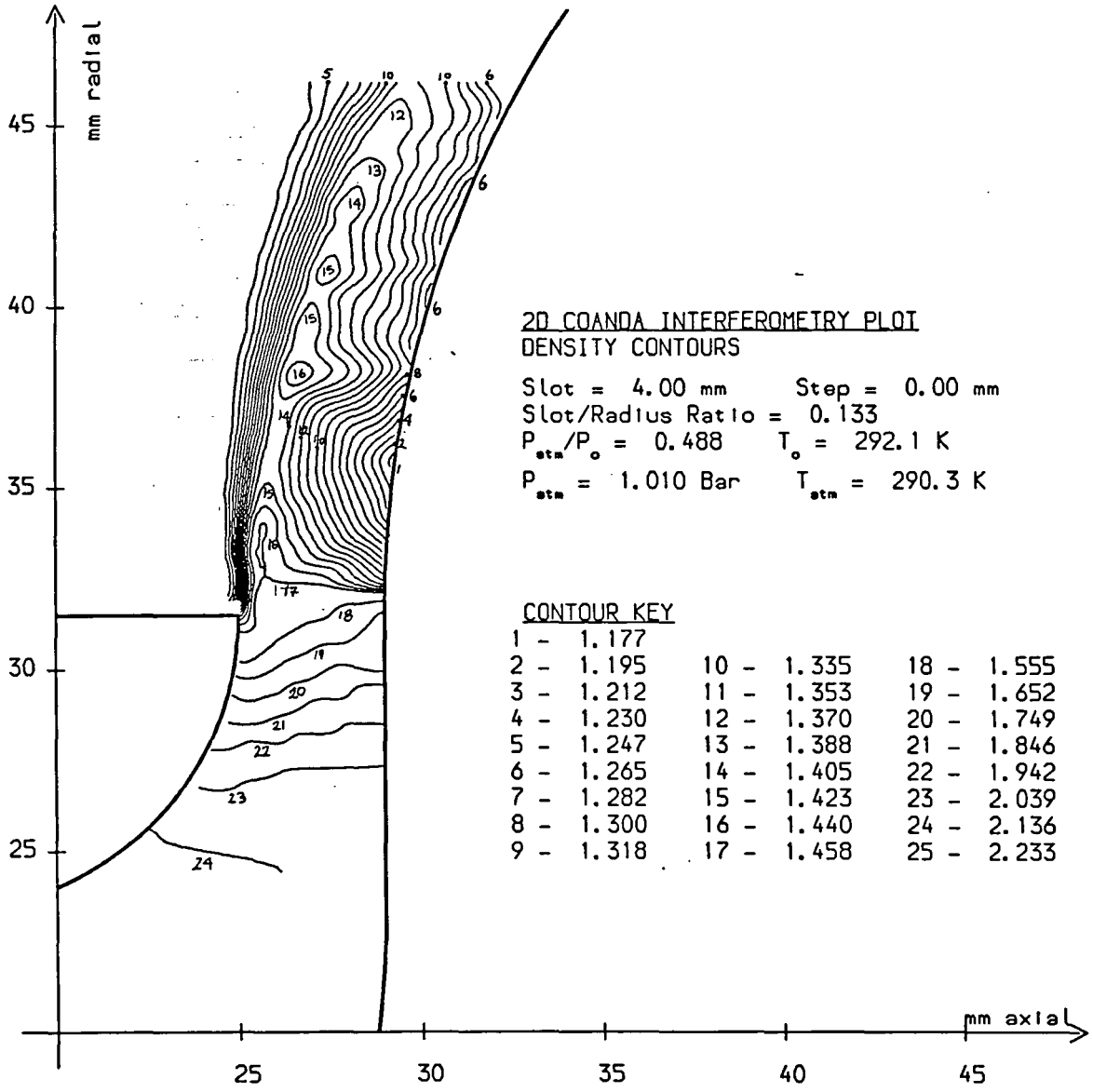

Figure 7.1.6 Interferometry Density Contours -- Choking Conditions

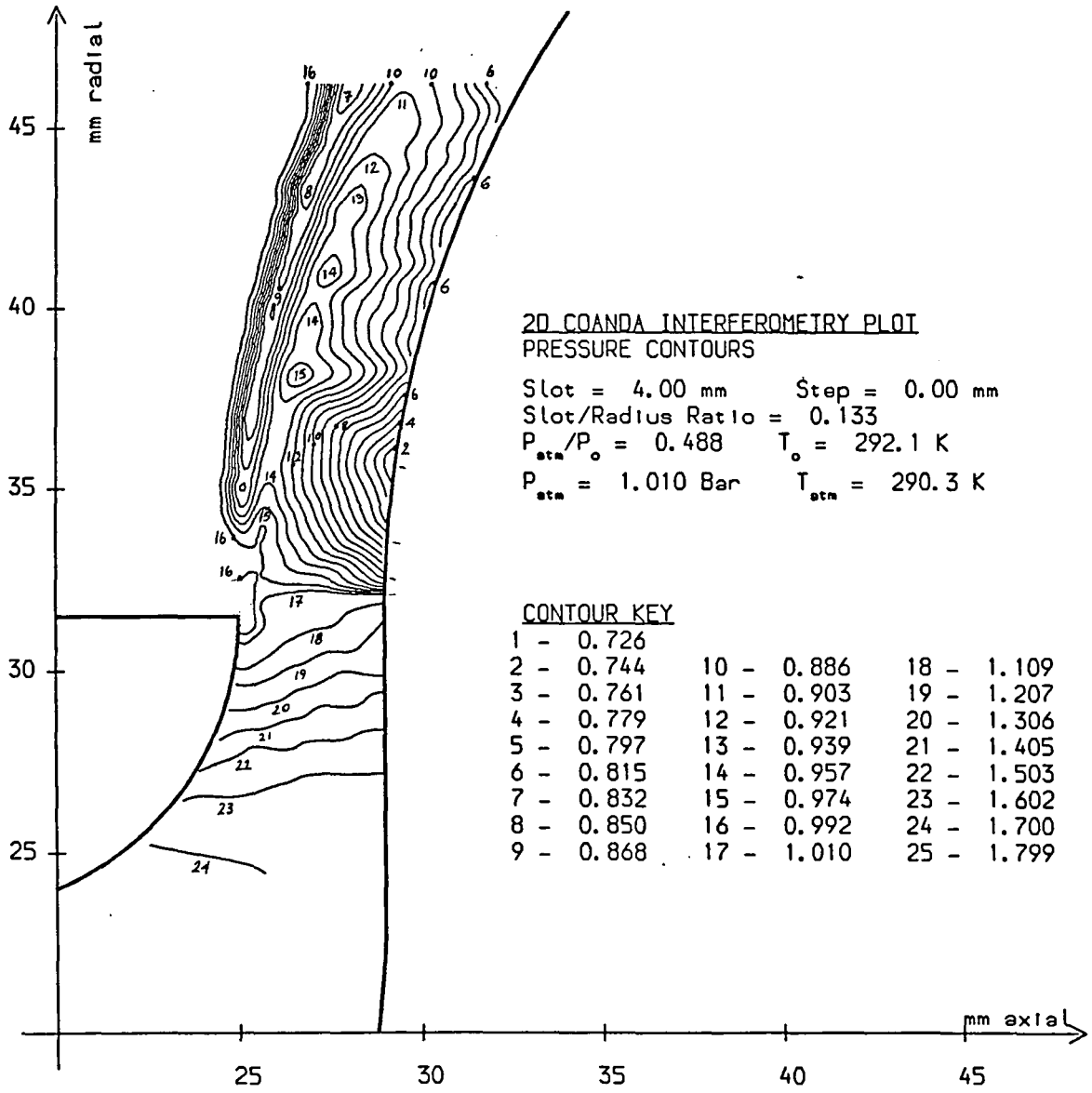

Figure 7.1.7 Interferometry Pressure Contours -- Choking Conditions

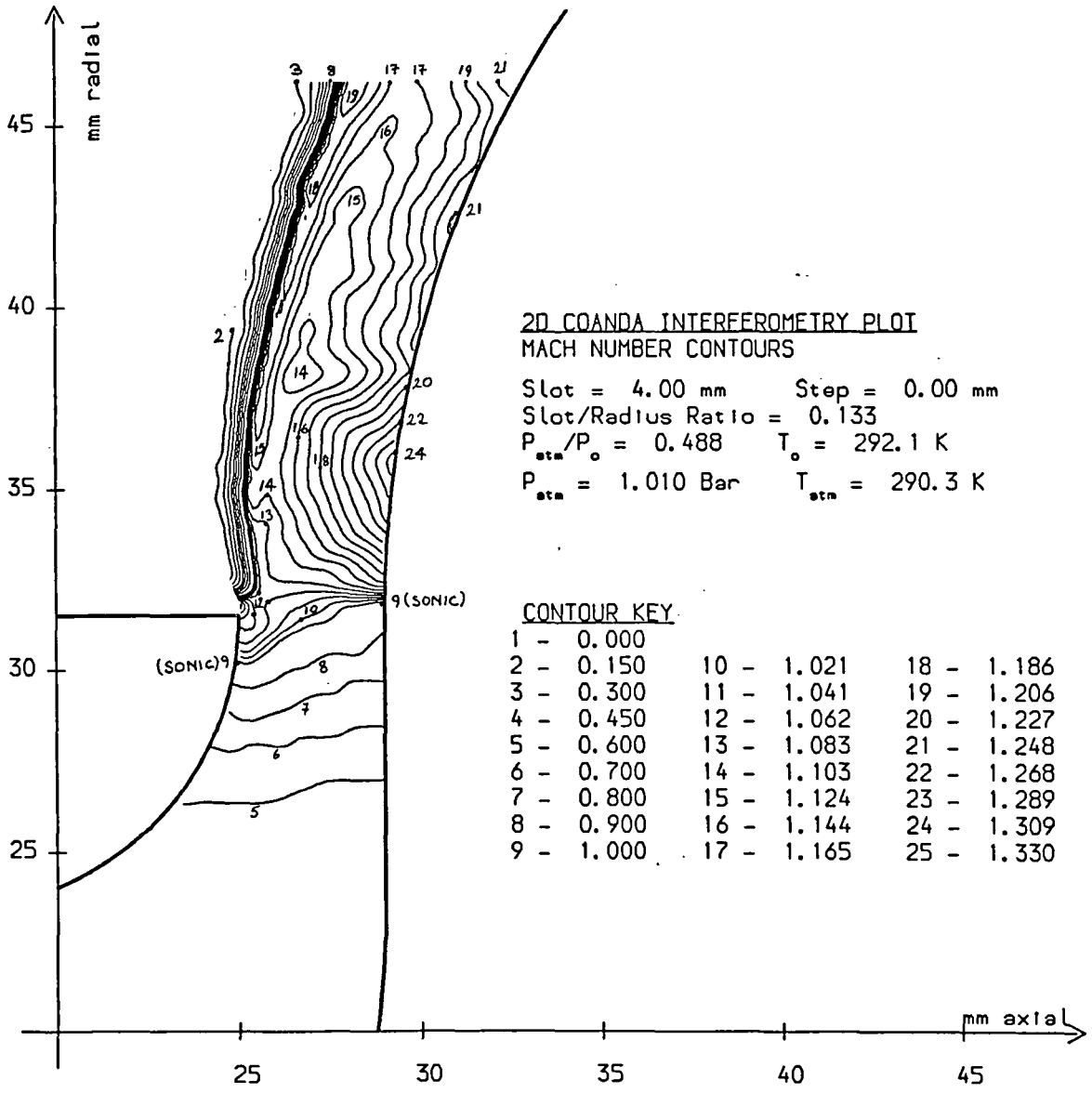

Figure 7.1.8 Interferometry Mach Number Contours -- Choking Conditions

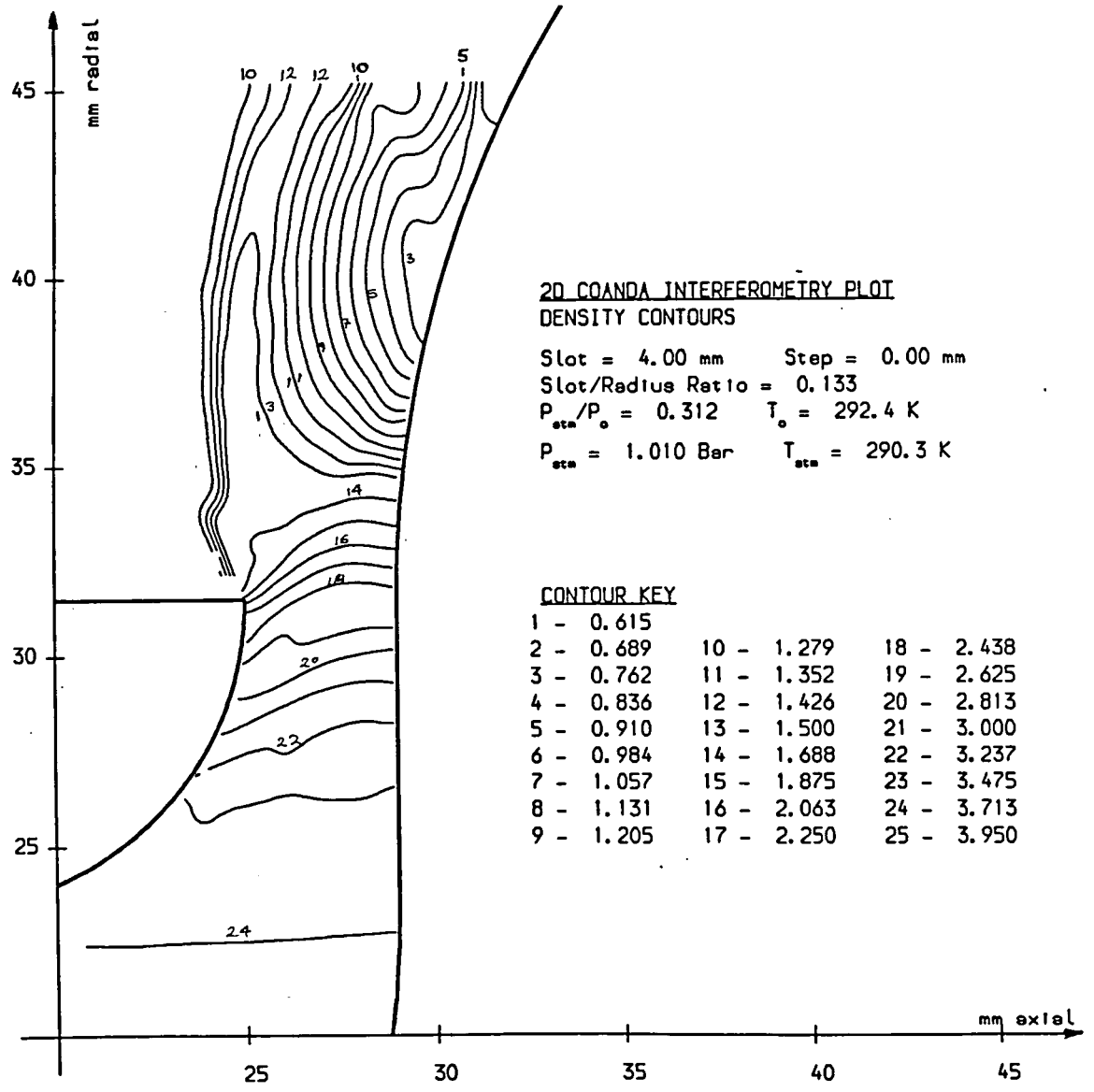

Figure 7.1.9 Interferometry Density Contours -- Underexpanding Conditions

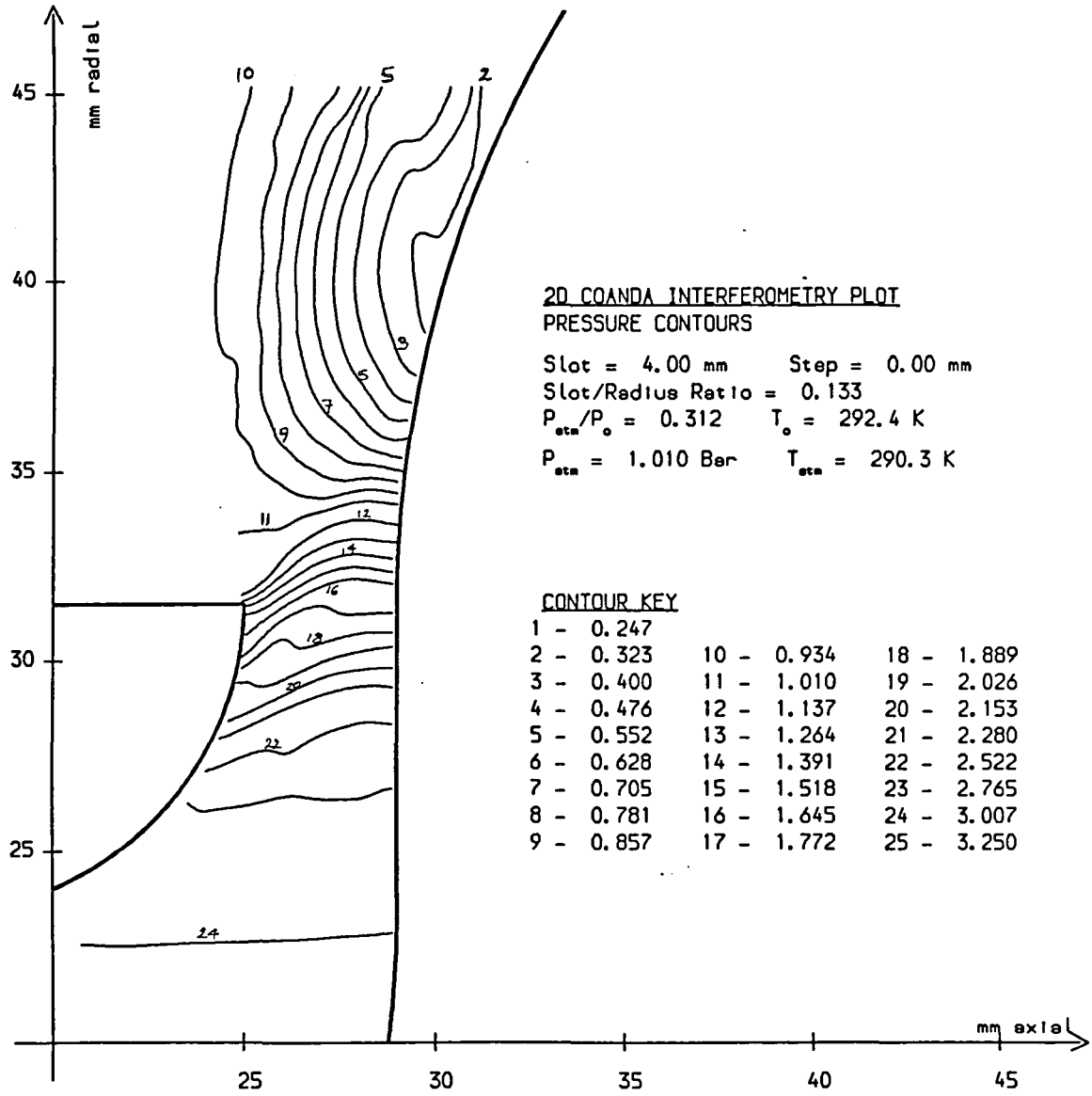

Figure 7.1.10 Interferometry Pressure Contours -- Underexpanding Conditions

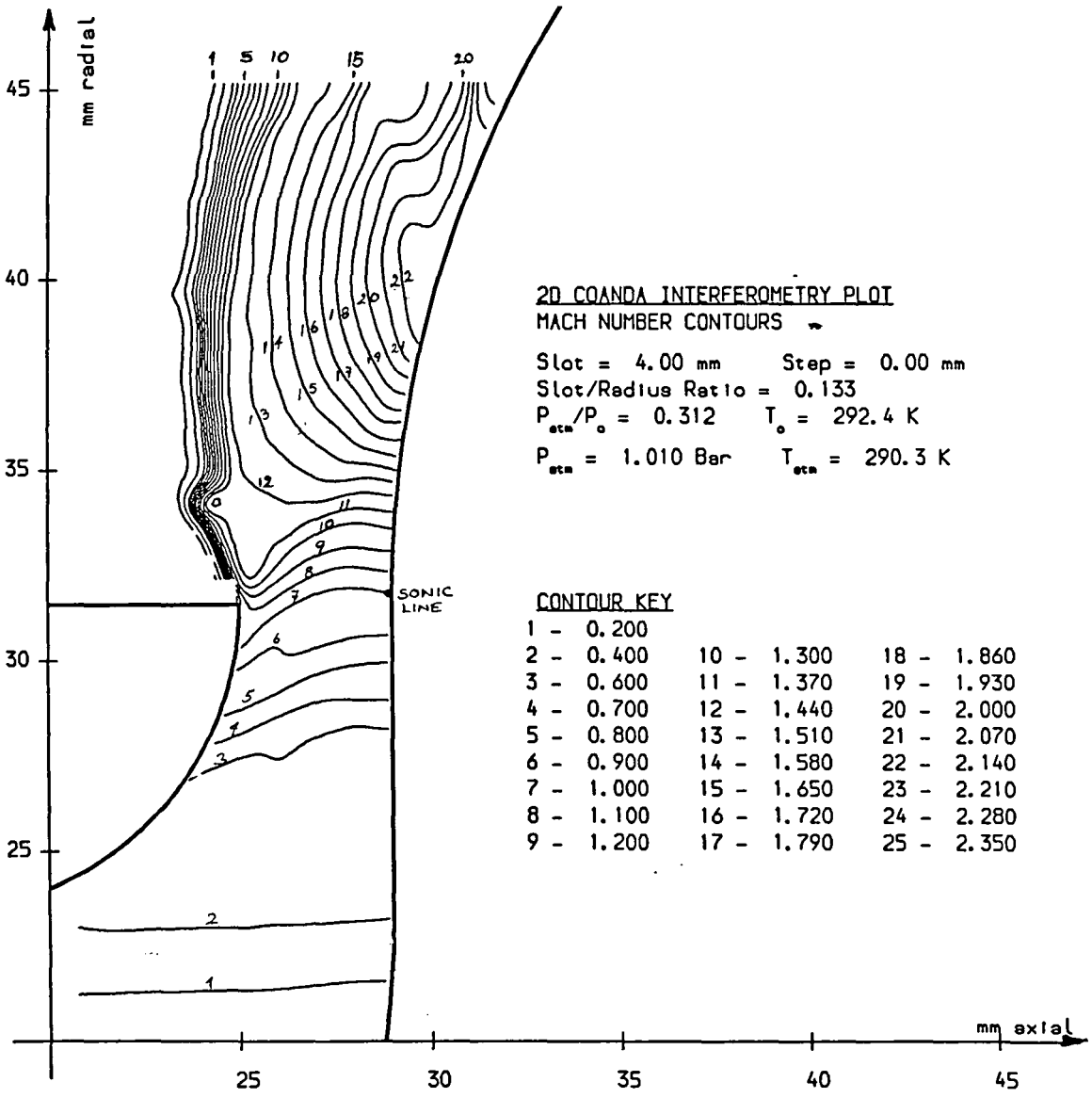

Figure 7.1.11 Interferometry Mach Number Contours -- Underexpanding Conditions

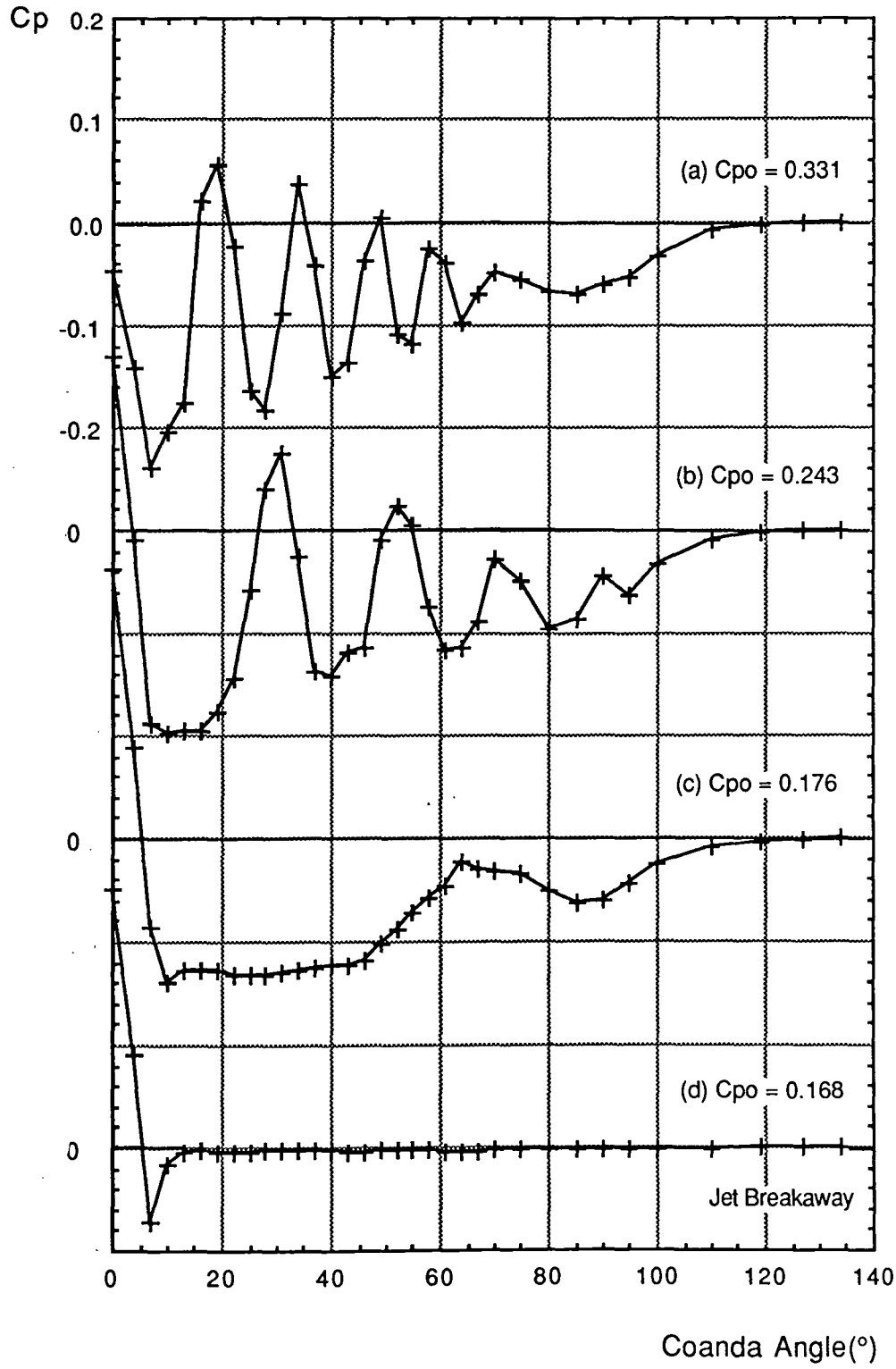

Figure 7.1.12.

Planar Coanda Model
Experimental Surface Pressures

Slot = 2.00 mm; Step = 0.00 mm

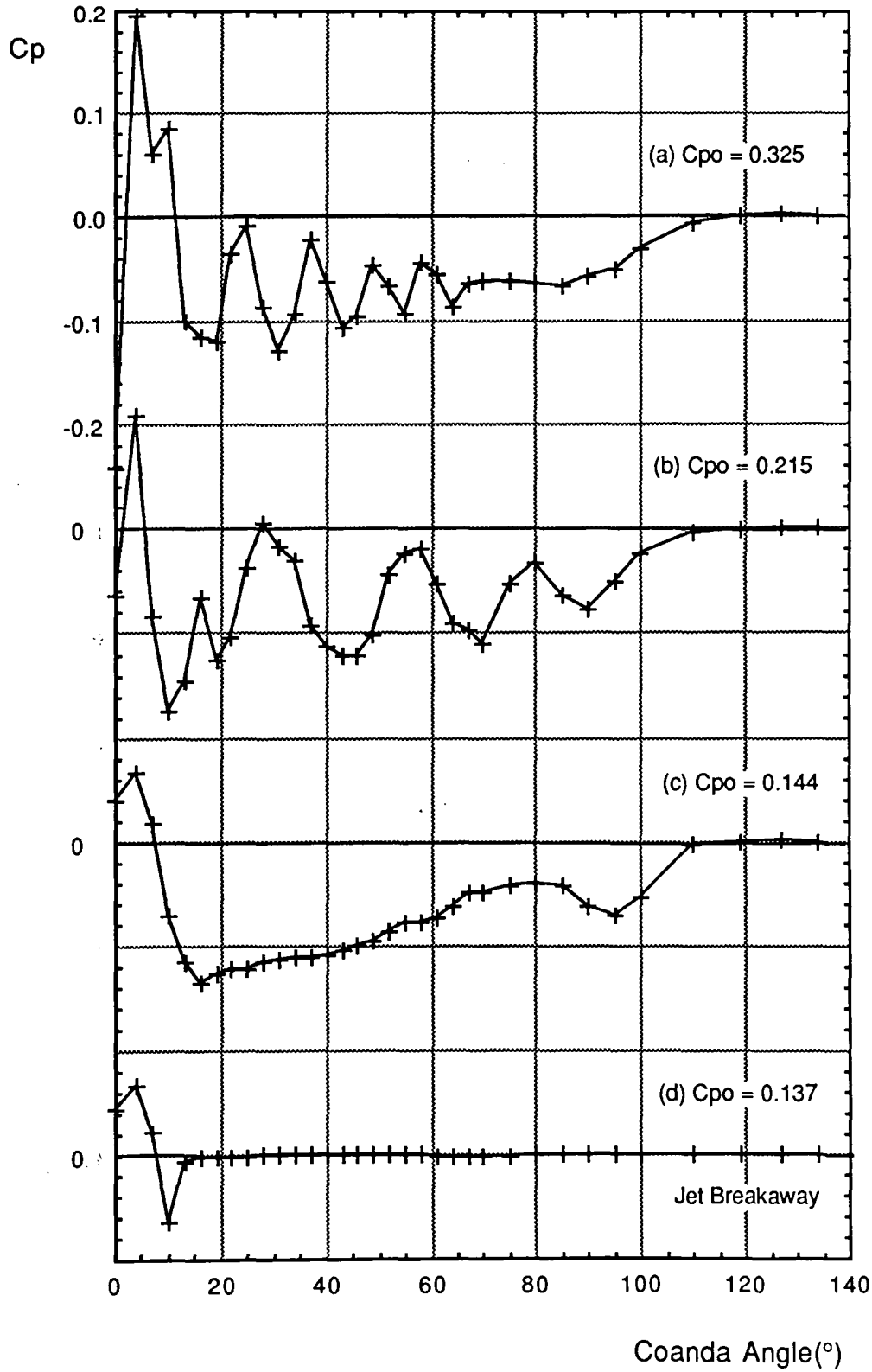

Figure 7.1.13.

Planar Coanda Model
Experimental Surface Pressures

Slot = 2.00 mm; Step = 0.75 mm

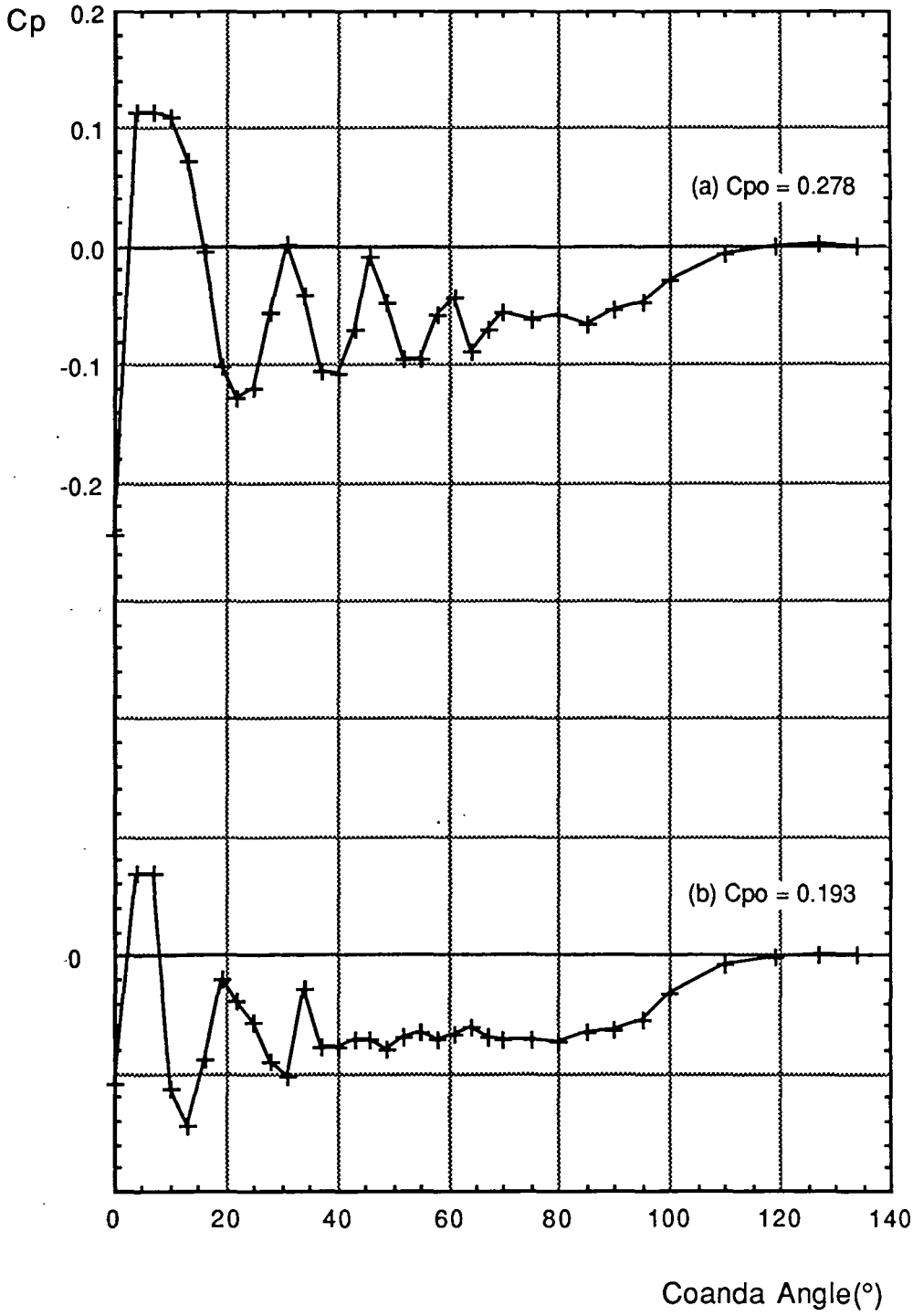

Figure 7. 1.14.

Planar Coanda Model
Experimental Surface Pressures

Slot = 2.00 mm; Step = 1.50 mm

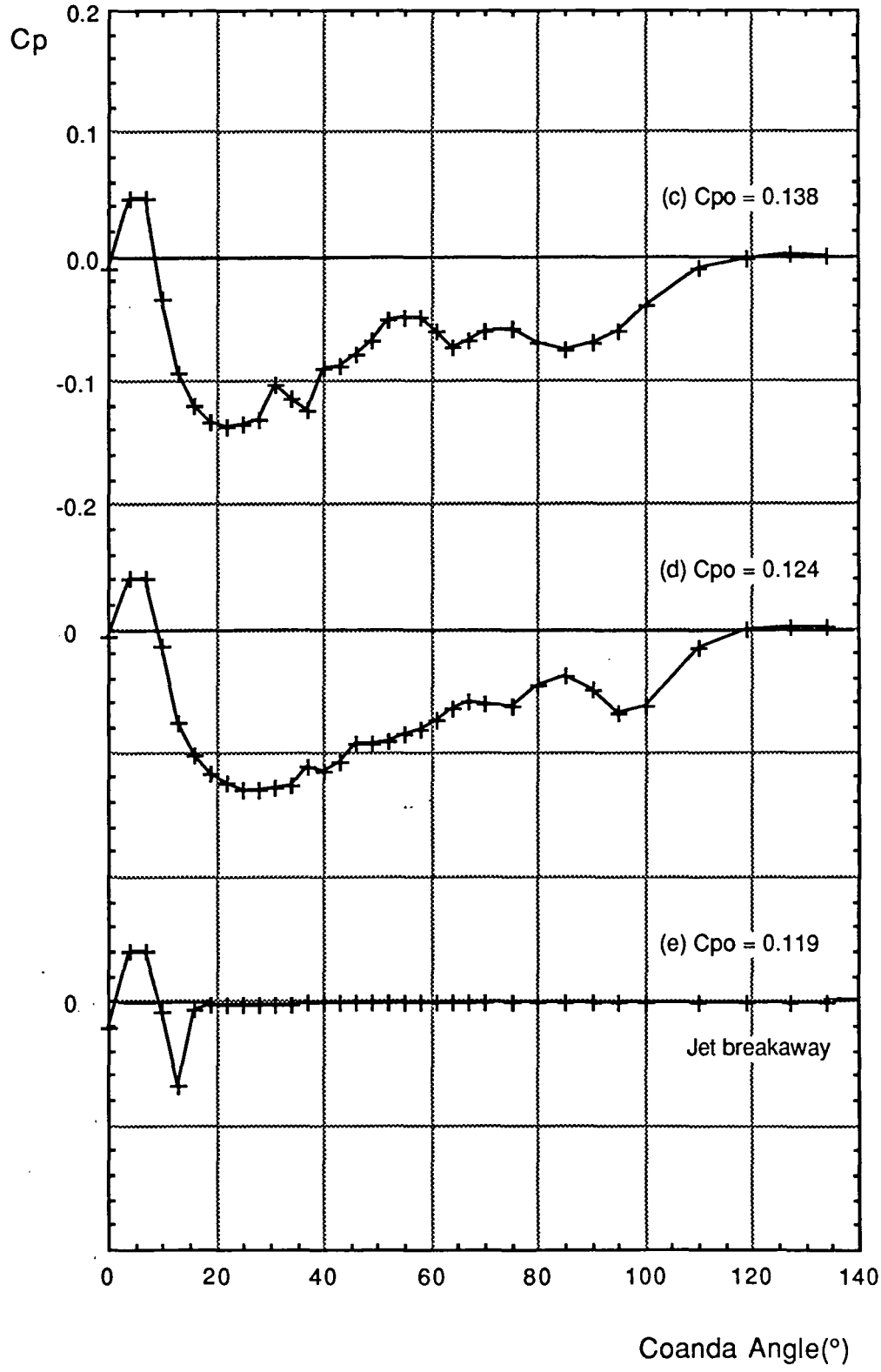

Figure 7. 1.15.

Planar Coanda Model
Experimental Surface Pressures

Slot = 2.00 mm; Step = 1.50 mm

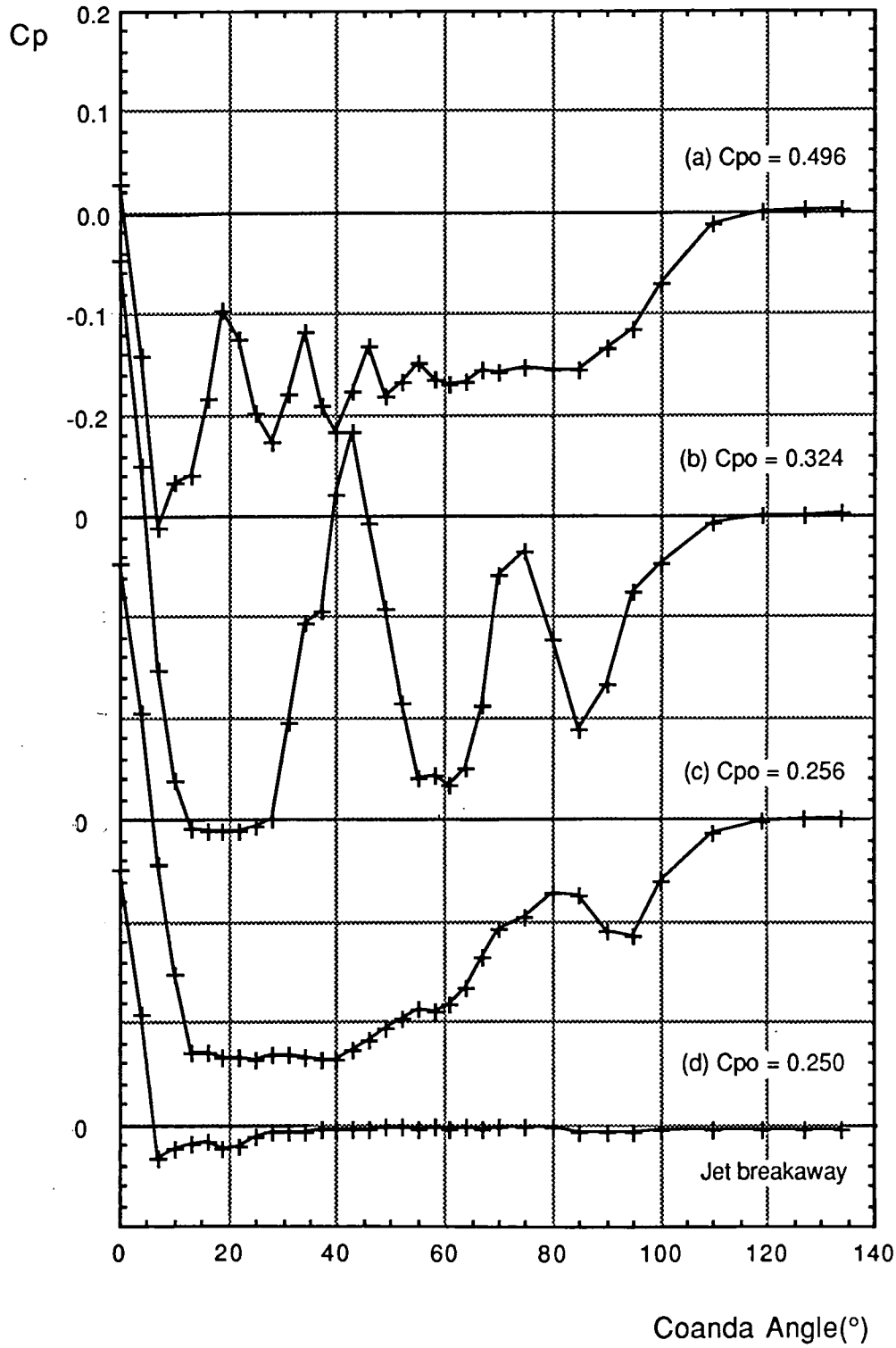

Figure 7. 1.16.

Planar Coanda Model
Experimental Surface Pressures

Slot = 4.00 mm; Step = 0.00 mm

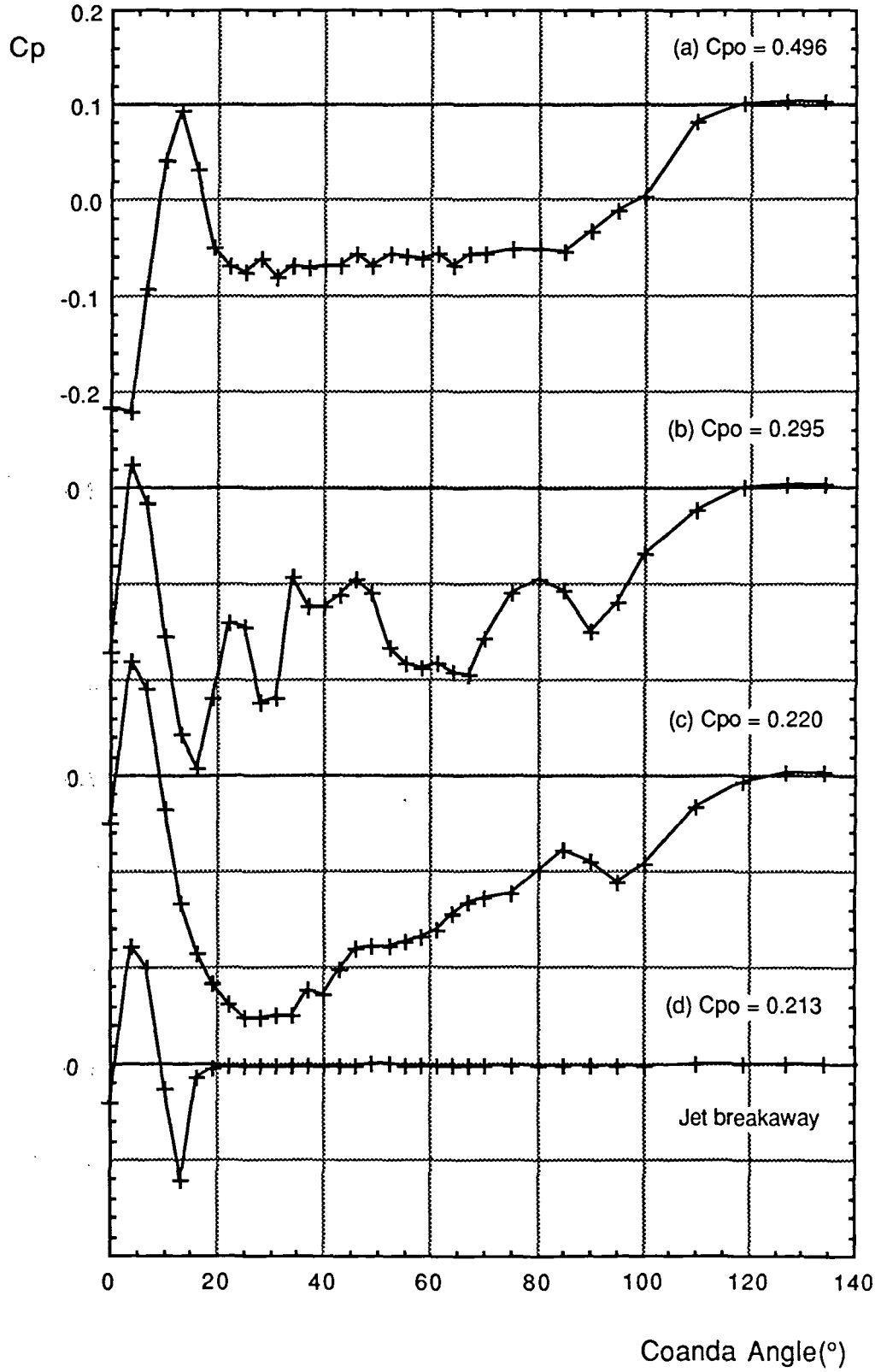

Figure 7.1.17.

Planar Coanda Model
Experimental Surface Pressures

Slot = 4.00 mm; Step = 0.75 mm

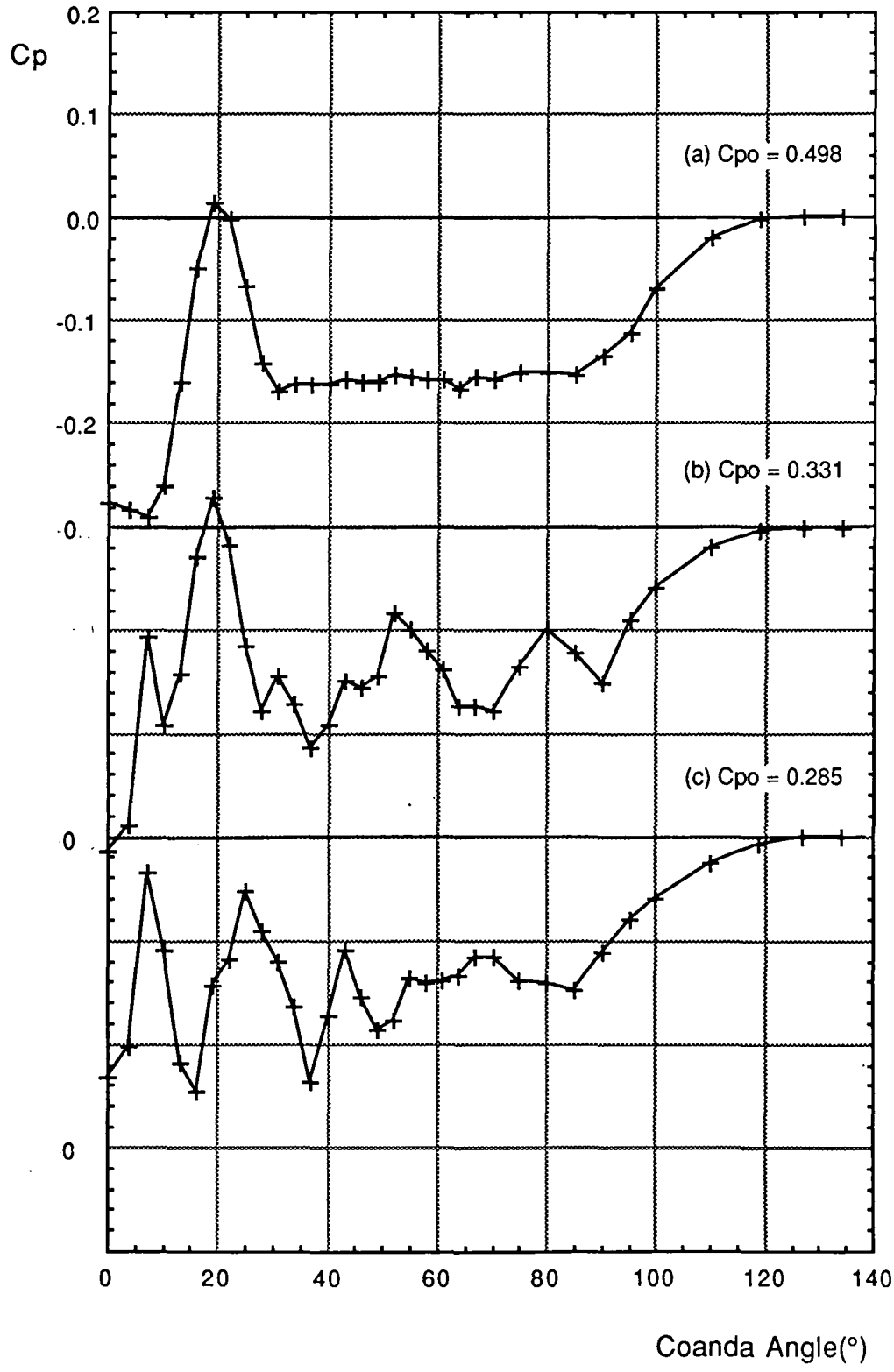

Figure 7.1.18.

Planar Coanda Model
Experimental Surface Pressures

Slot = 4.00 mm; Step = 1.50 mm

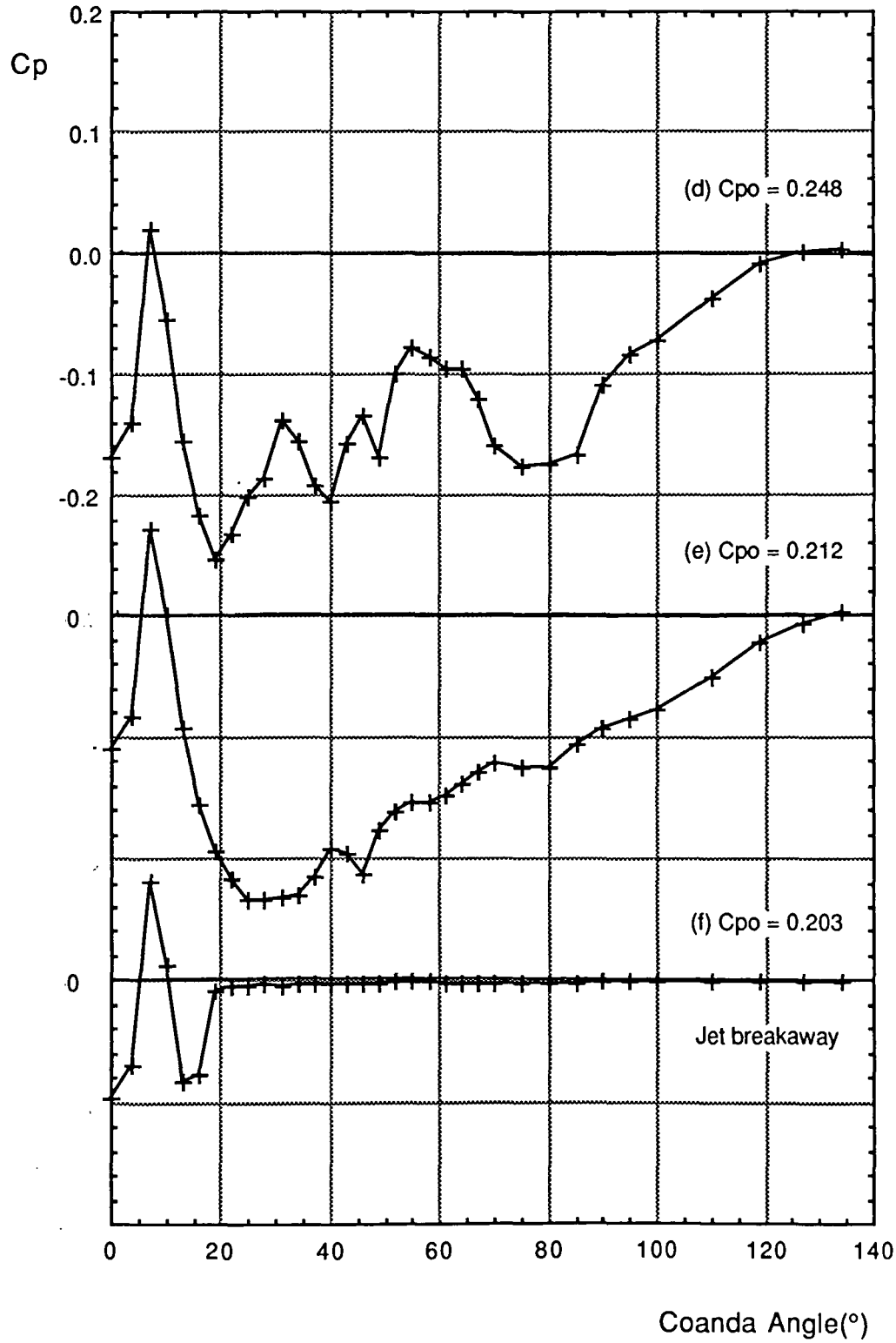

Figure 7.1.19.

Planar Coanda Model
Experimental Surface Pressures

Slot = 4.00 mm; Step = 1.50 mm

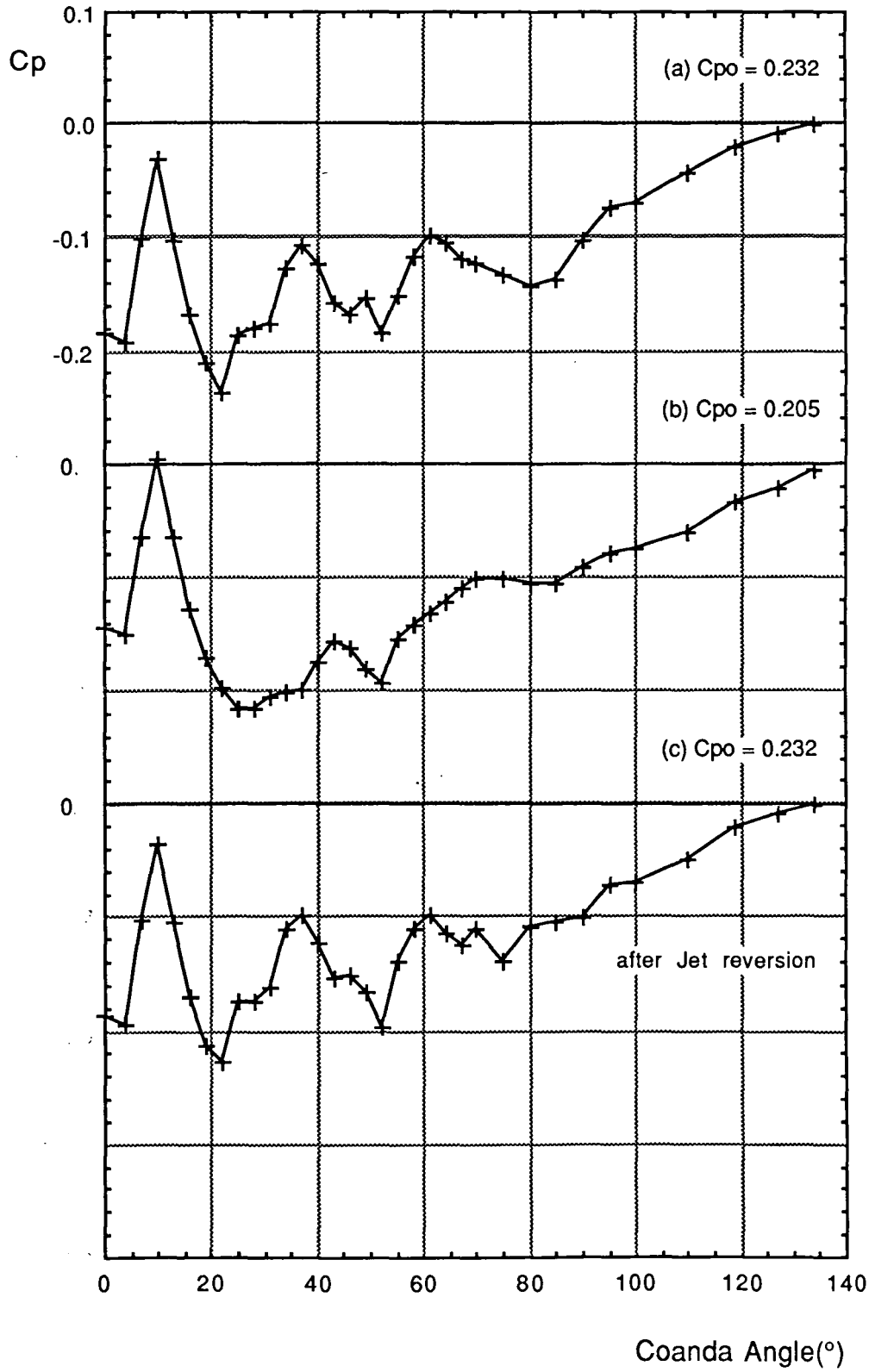

Figure 7.1.20.

Planar Coanda Model
Experimental Surface Pressures

Slot = 4.00 mm; Step = 2.55 mm

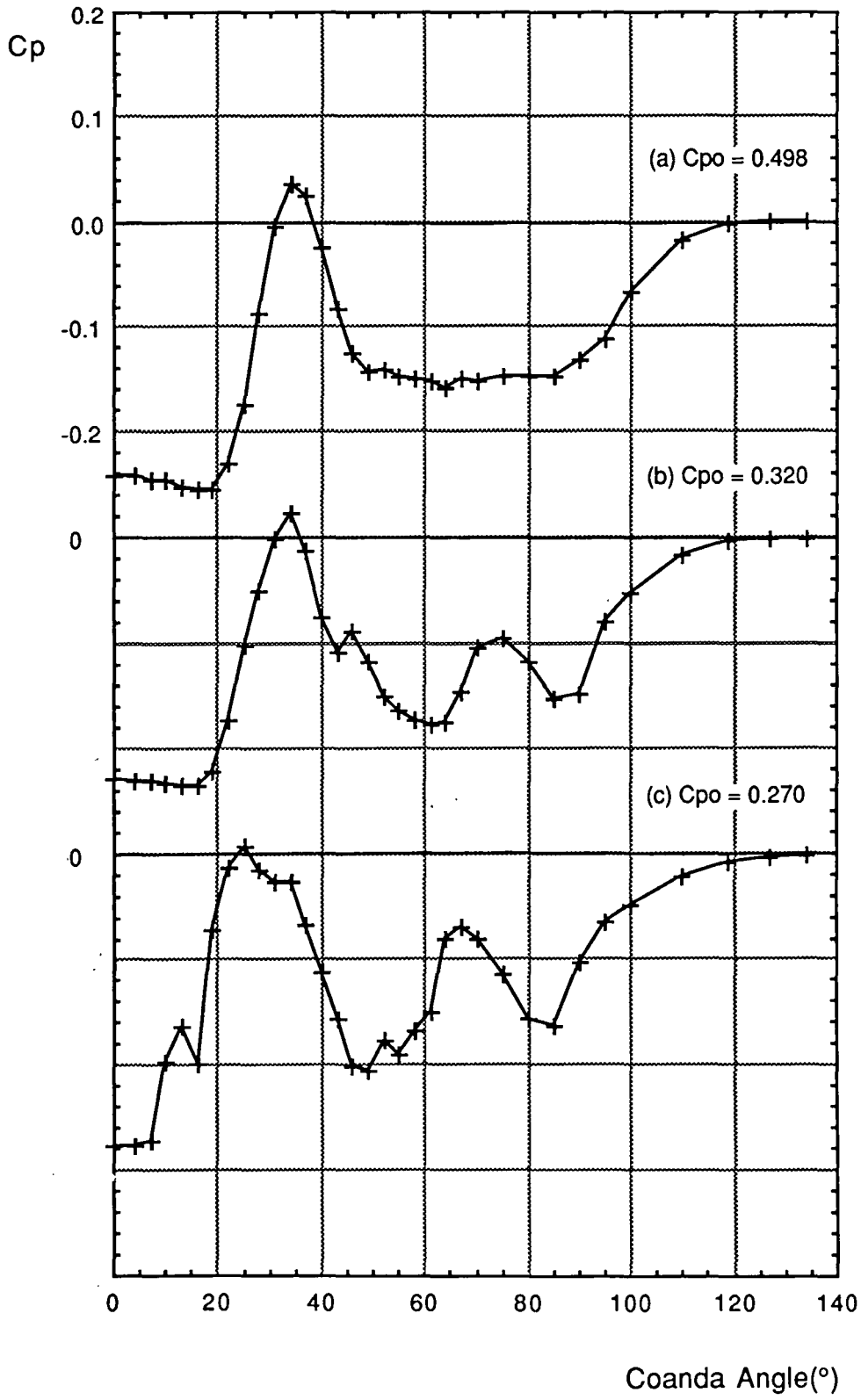

Figure 7.1.21.

Planar Coanda Model
Experimental Surface Pressures

Slot = 4.00 mm; Step = 3.76 mm

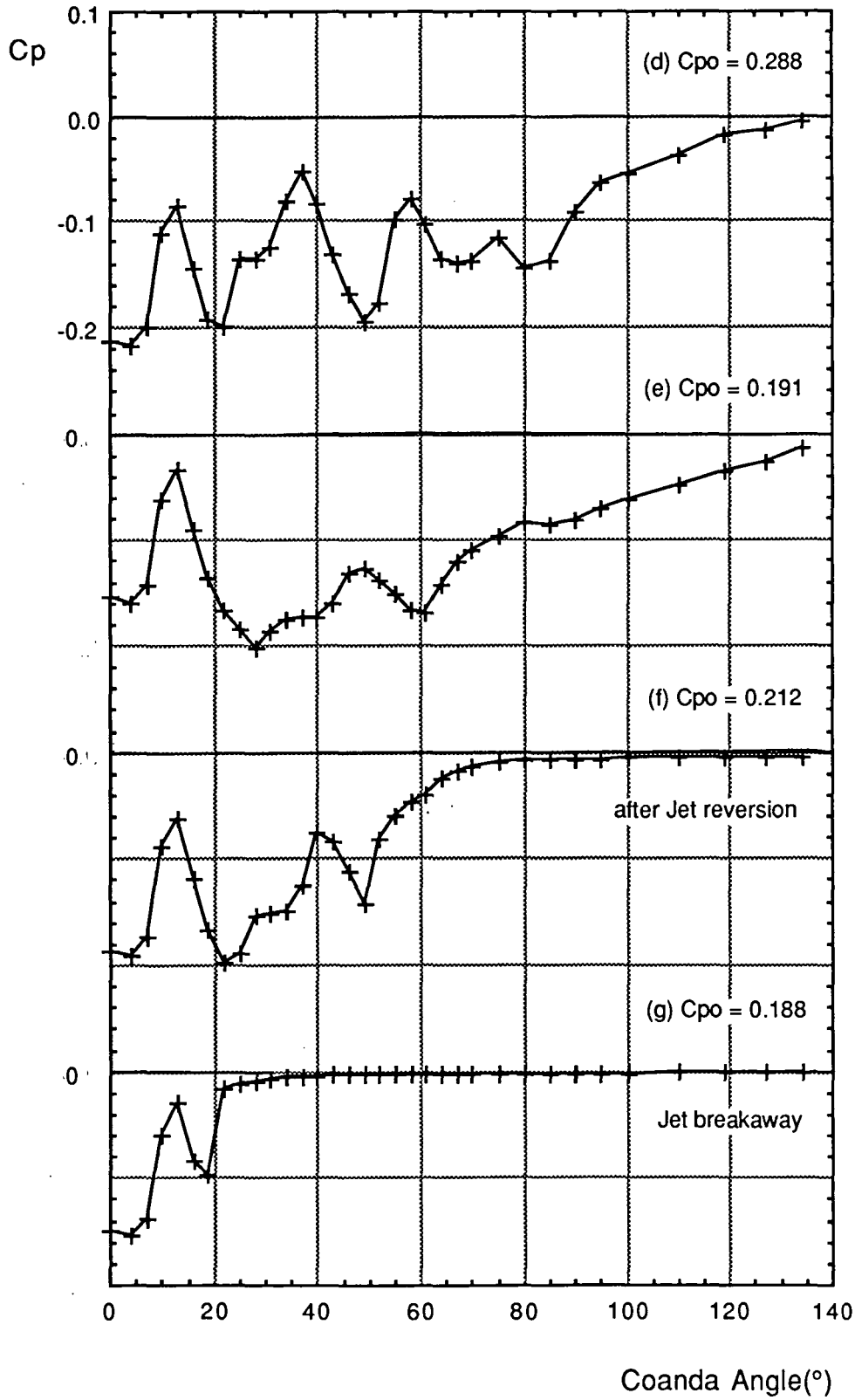

Figure 7.1.22.

Planar Coanda Model
Experimental Surface Pressures

Slot = 4.00 mm; Step = 3.76 mm

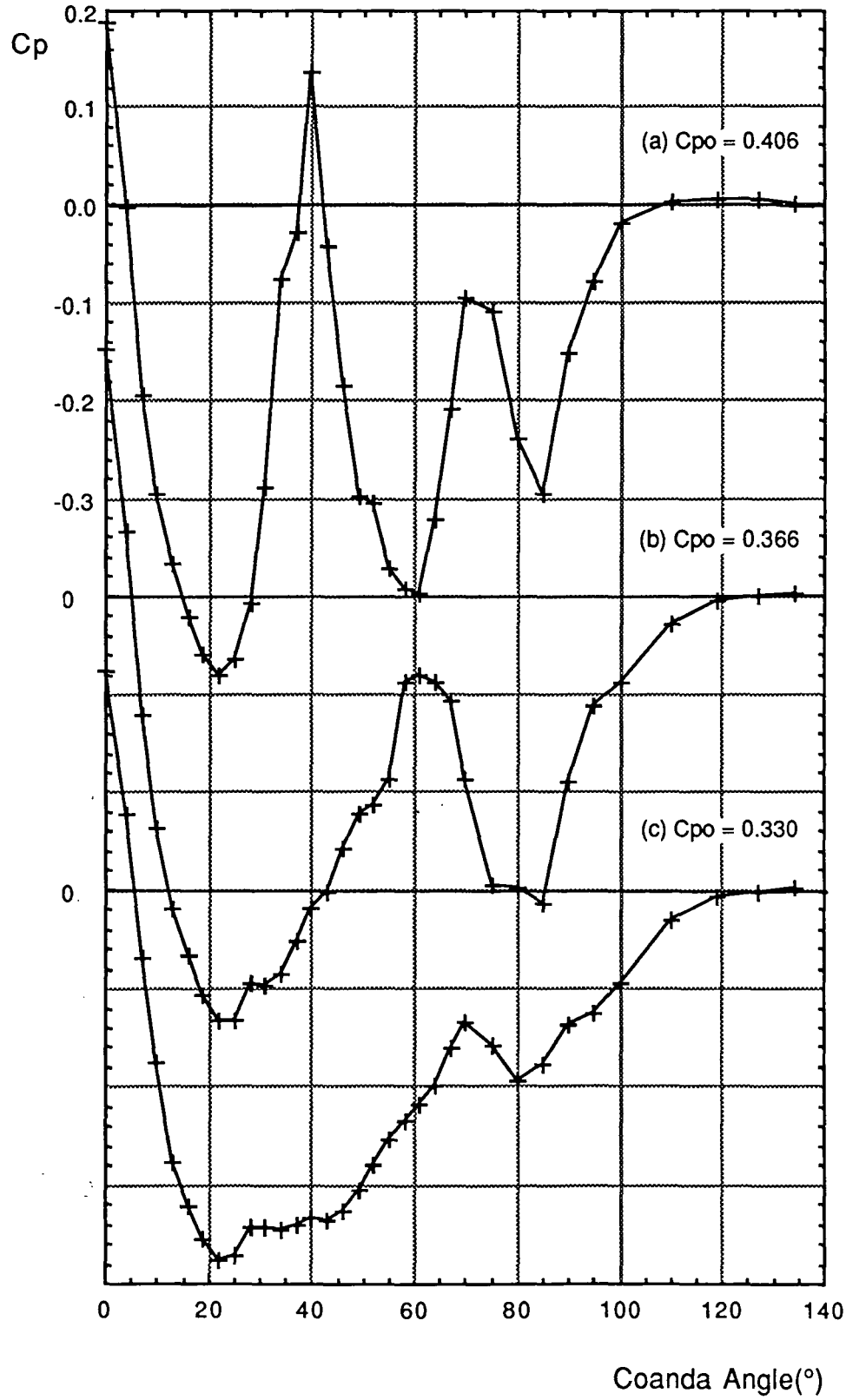

Figure 7.1.23.

Planar Coanda Model
Experimental Surface Pressures

Slot = 6.00 mm; Step = 0.00 mm

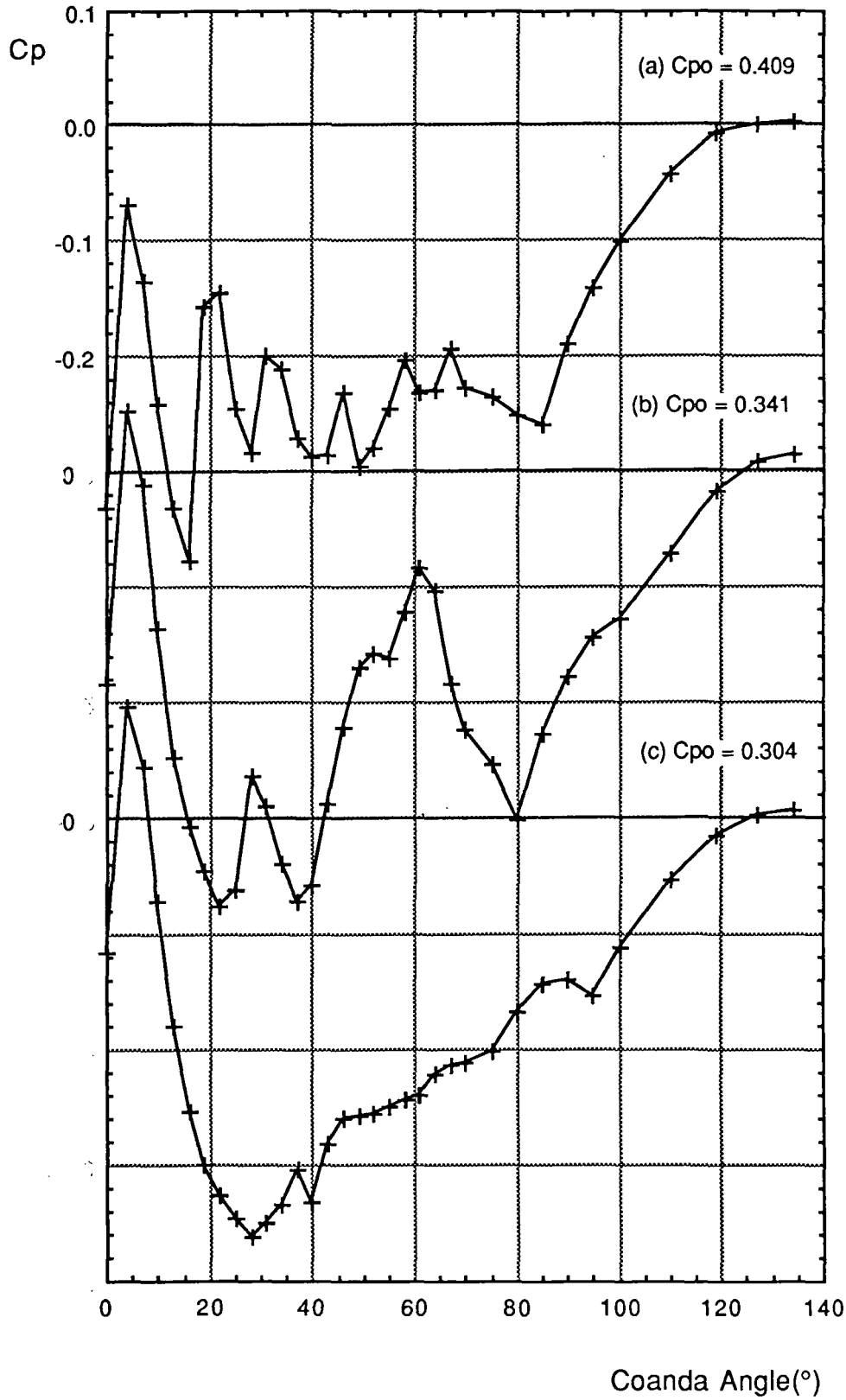

Figure 7.1.24.

Planar Coanda Model
Experimental Surface Pressures

Slot = 6.00 mm; Step = 0.75 mm

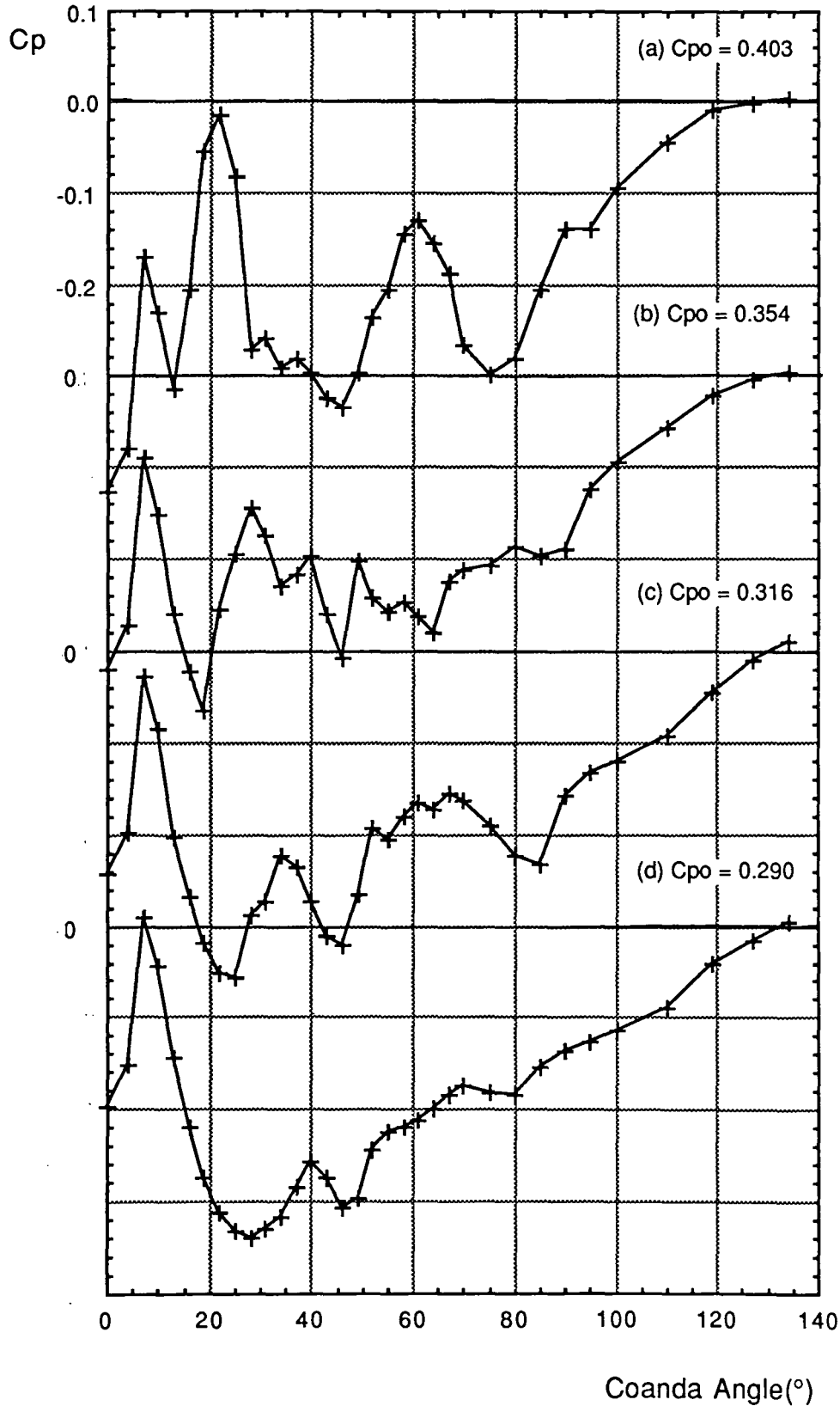

Figure 7.1.25.

Planar Coanda Model
Experimental Surface Pressures

Slot = 6.00 mm; Step = 1.50 mm

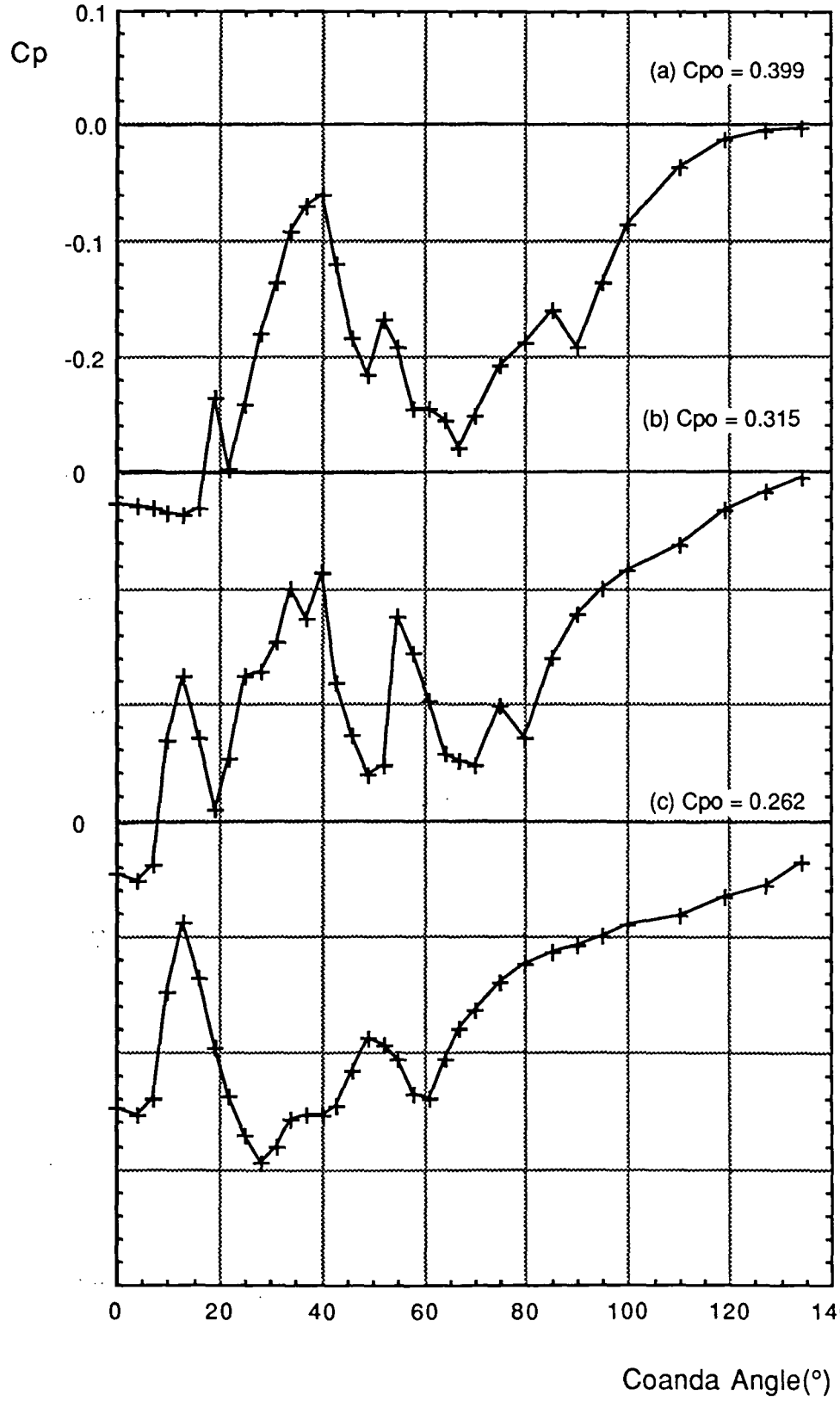

Figure 7.1.26.

Planar Coanda Model
Experimental Surface Pressures

Slot = 6.00 mm; Step = 3.75 mm

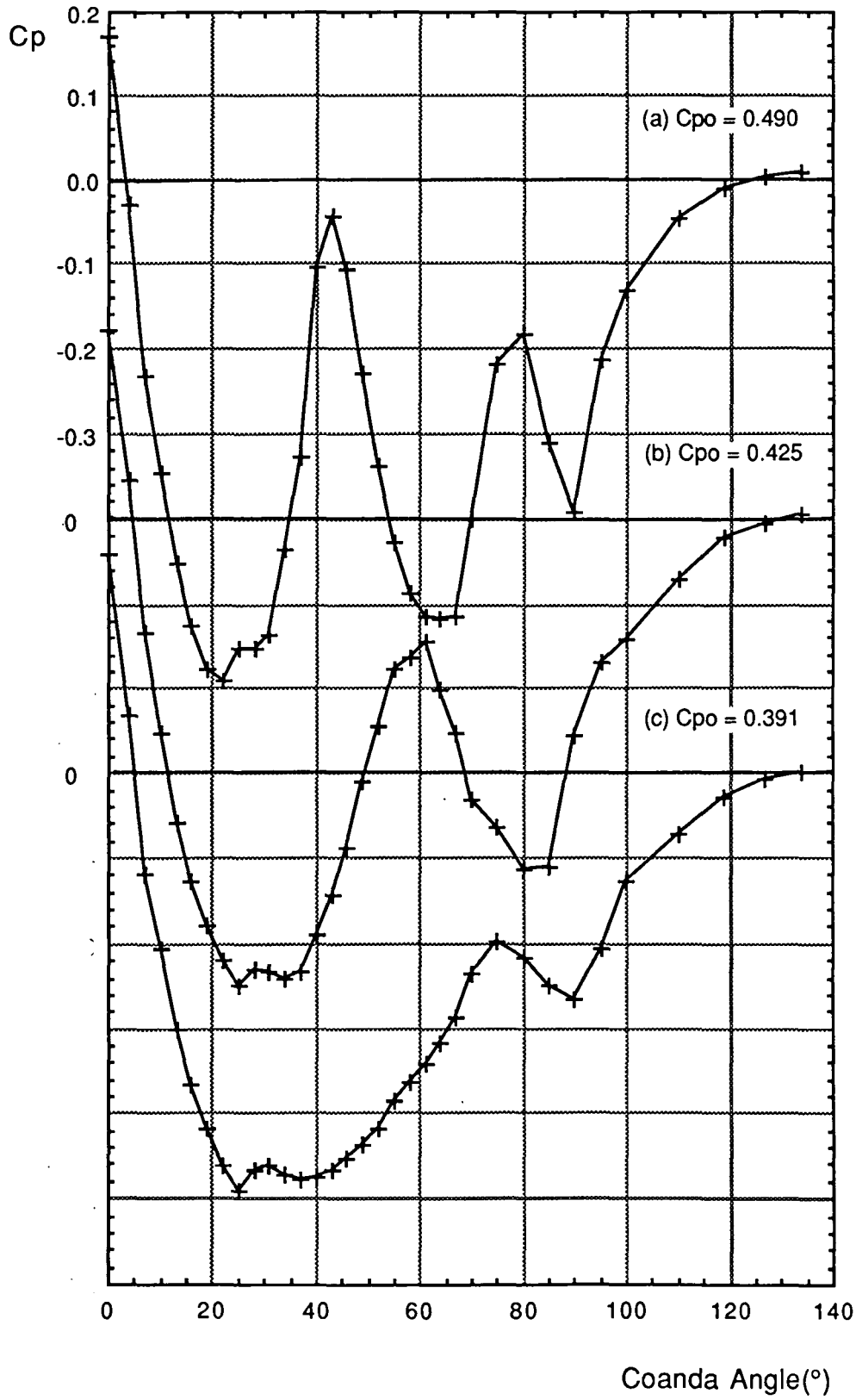

Figure 7.1.27.

Planar Coanda Model
Experimental Surface Pressures

Slot = 8.00 mm; Step = 0.00 mm

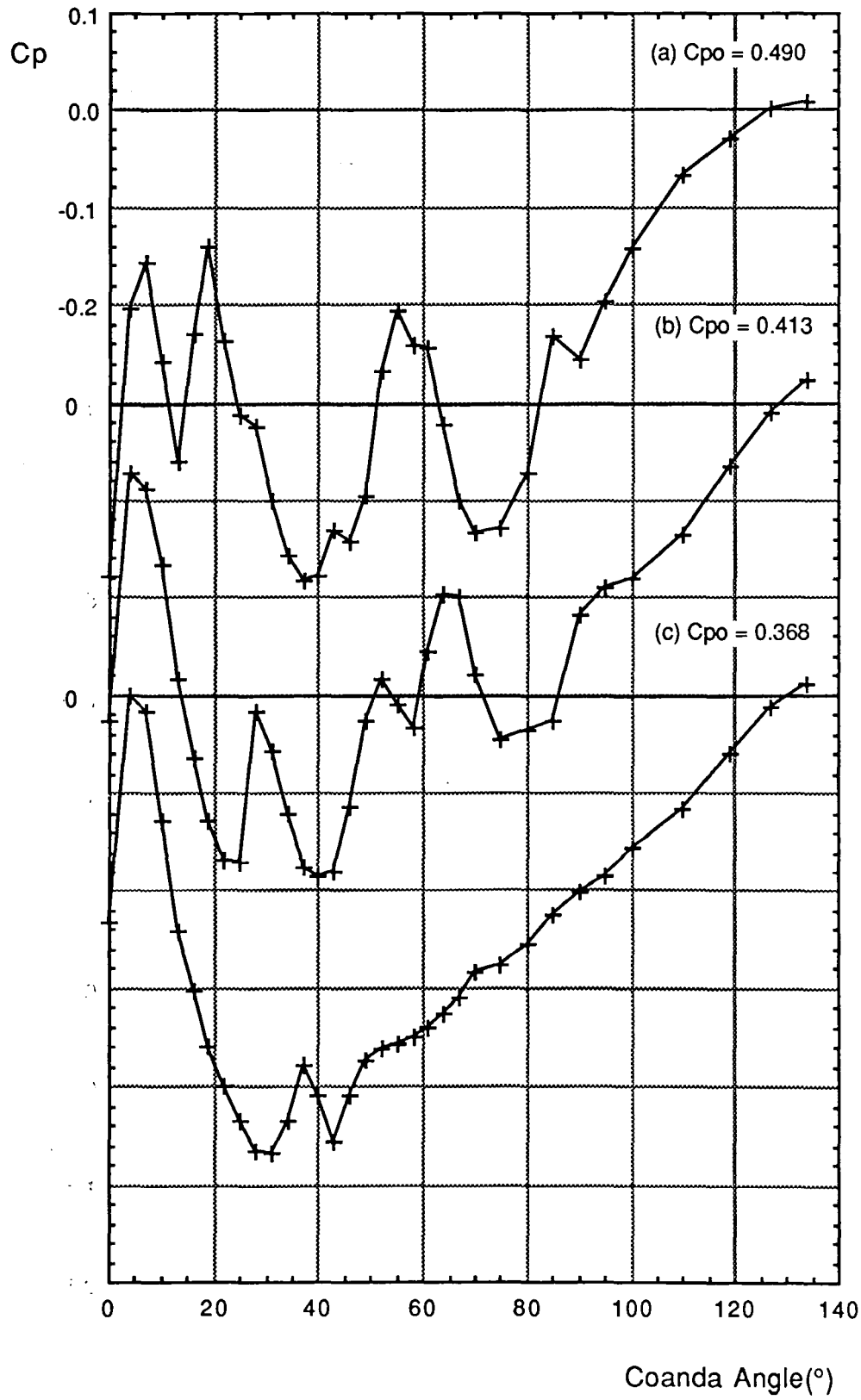

Figure 7.1.28.

Planar Coanda Model
Experimental Surface Pressures

Slot = 8.00 mm; Step = 0.75 mm

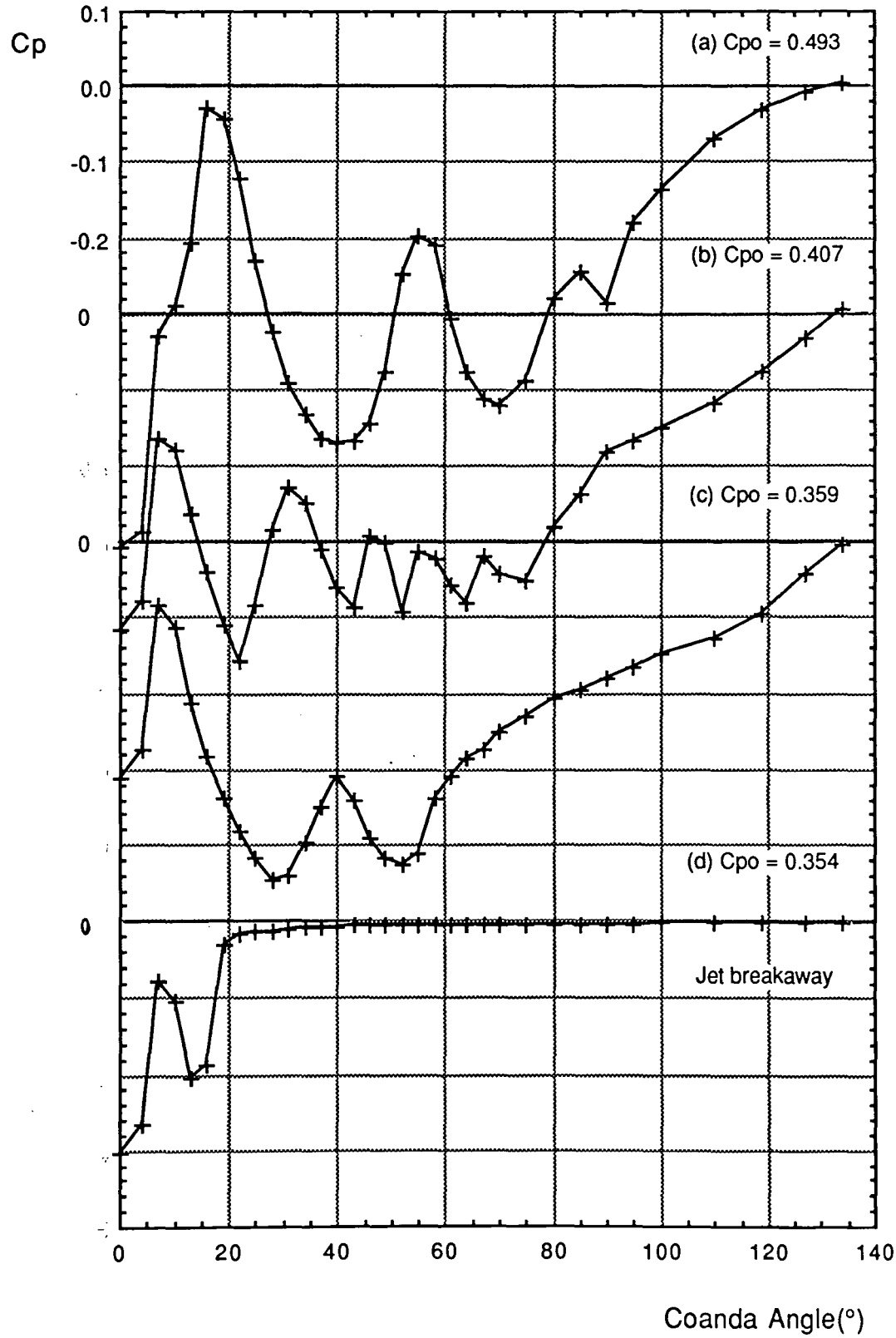

Figure 7.1.29.

Planar Coanda Model
Experimental Surface Pressures

Slot = 8.00 mm; Step = 1.50 mm

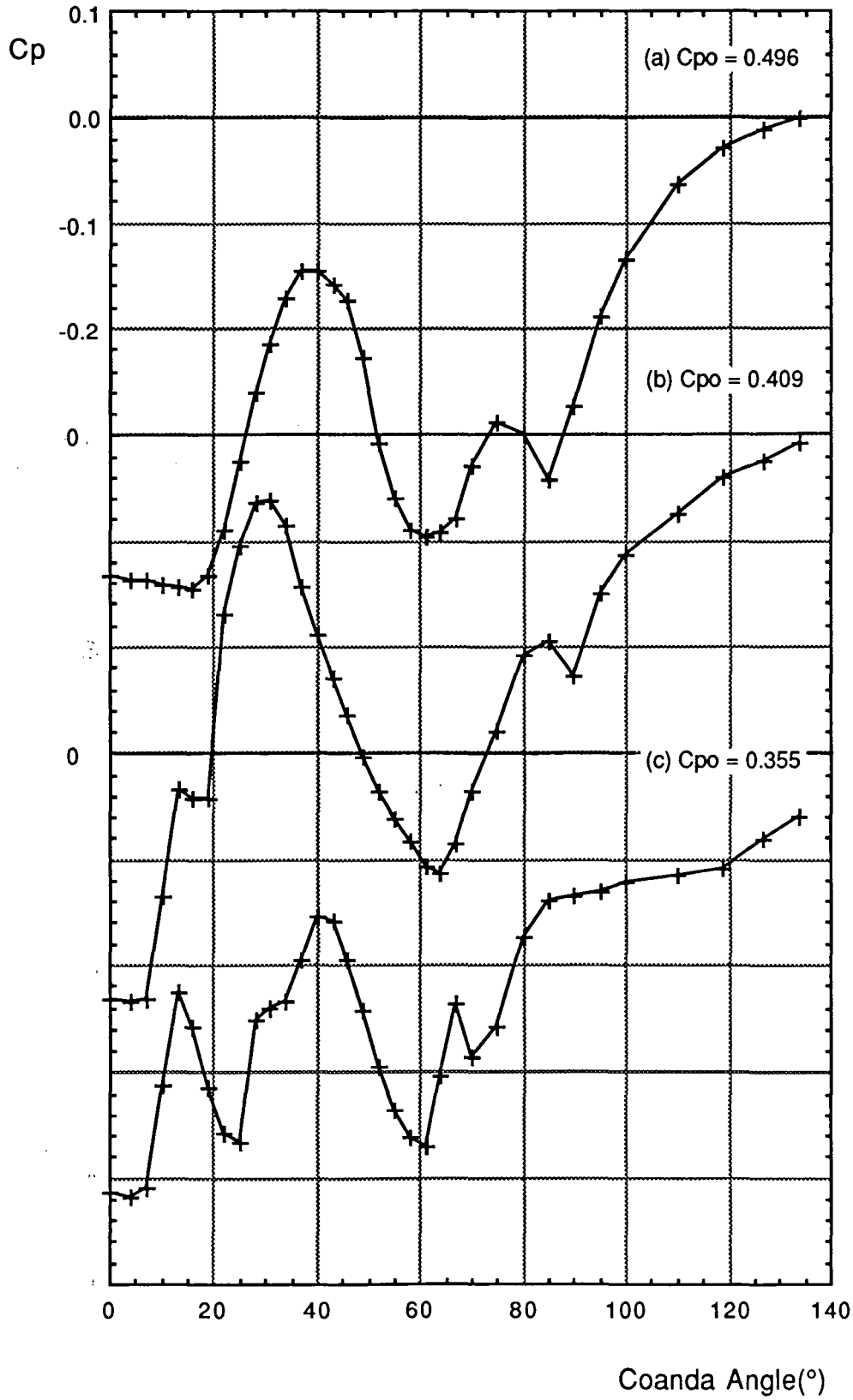

Figure 7.1.30.

Planar Coanda Model
Experimental Surface Pressures

Slot = 8.00 mm; Step = 3.75 mm

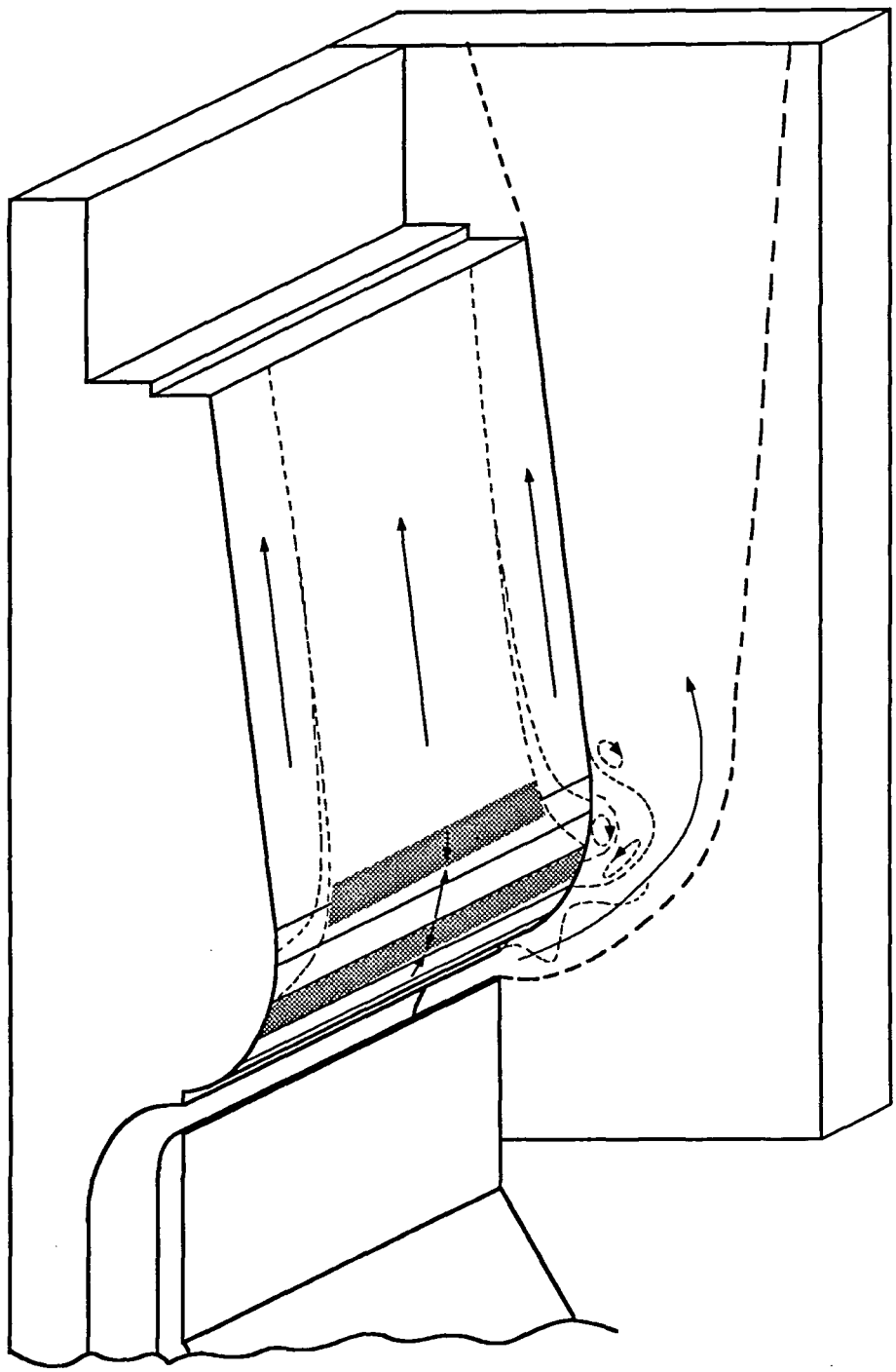

Figure 7.1. 31. Planar Flare Model Endwall Flow

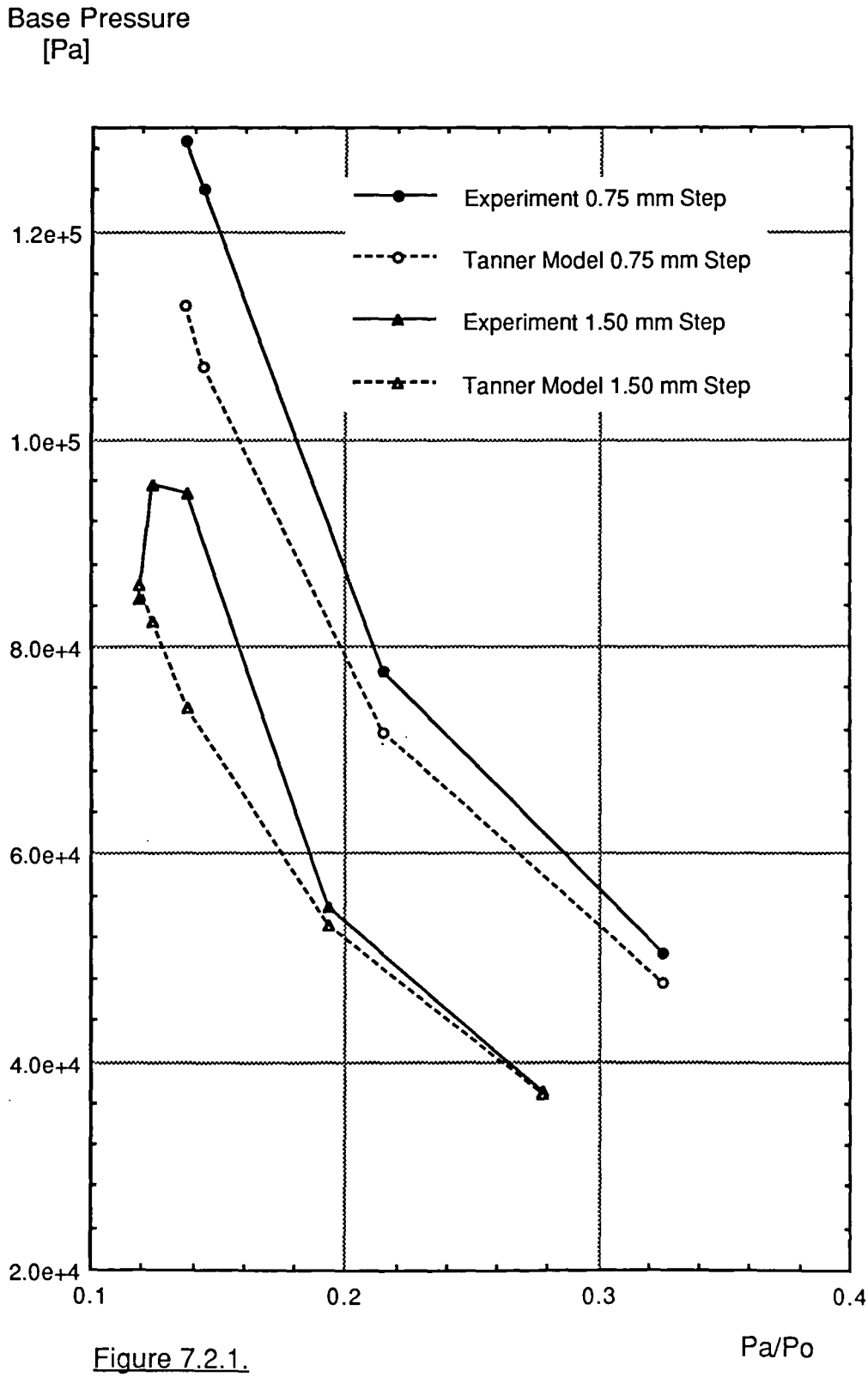

Figure 7.2.1.

Planar Coanda Model
Base Pressures: 2.00 mm Slot

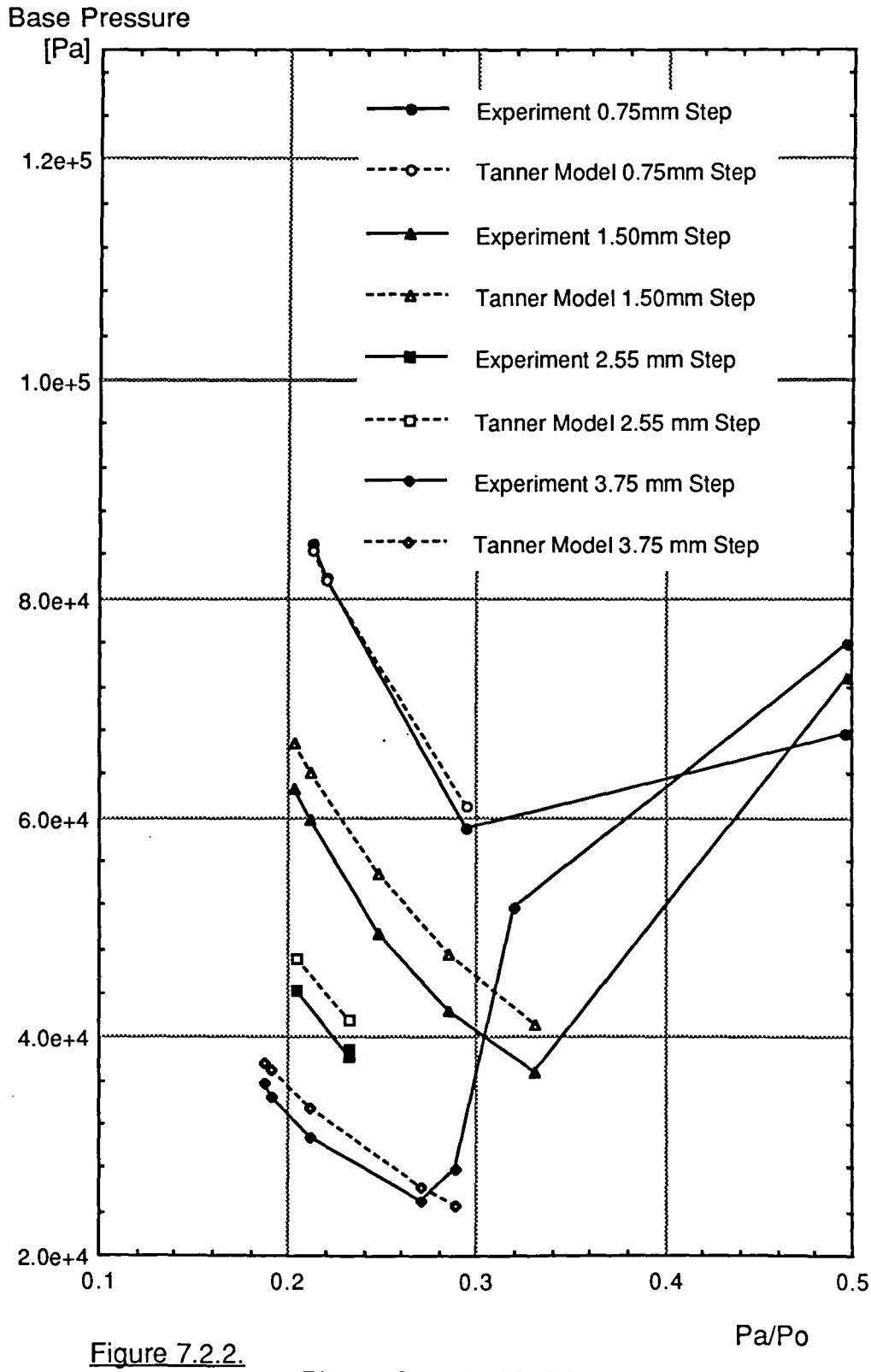

Figure 7.2.2.

Planar Coanda Model
Base Pressures: 4.00 mm Slot

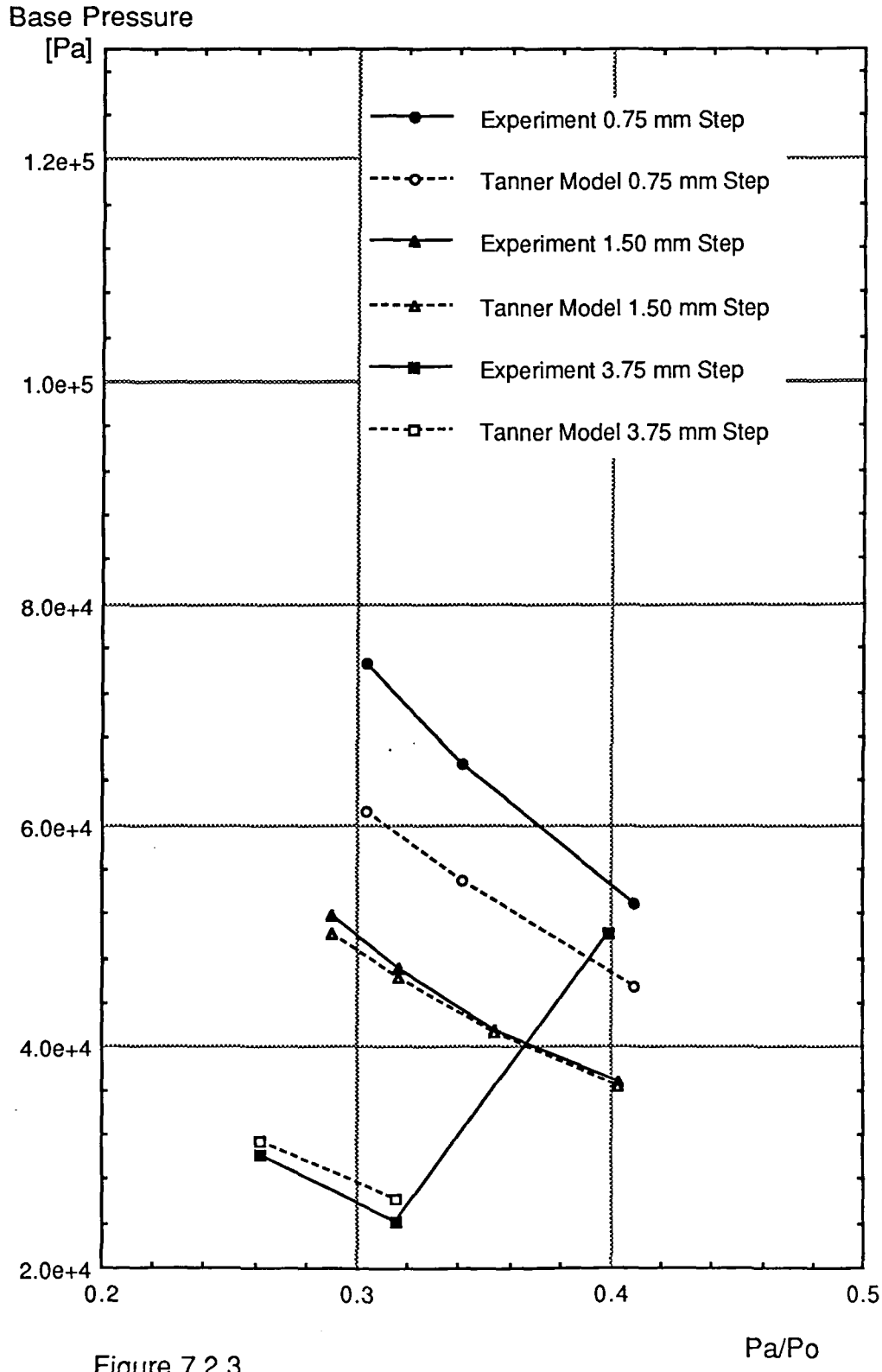

Figure 7.2.3.

Planar Coanda Model
Base Pressures: 6.00 mm Slot

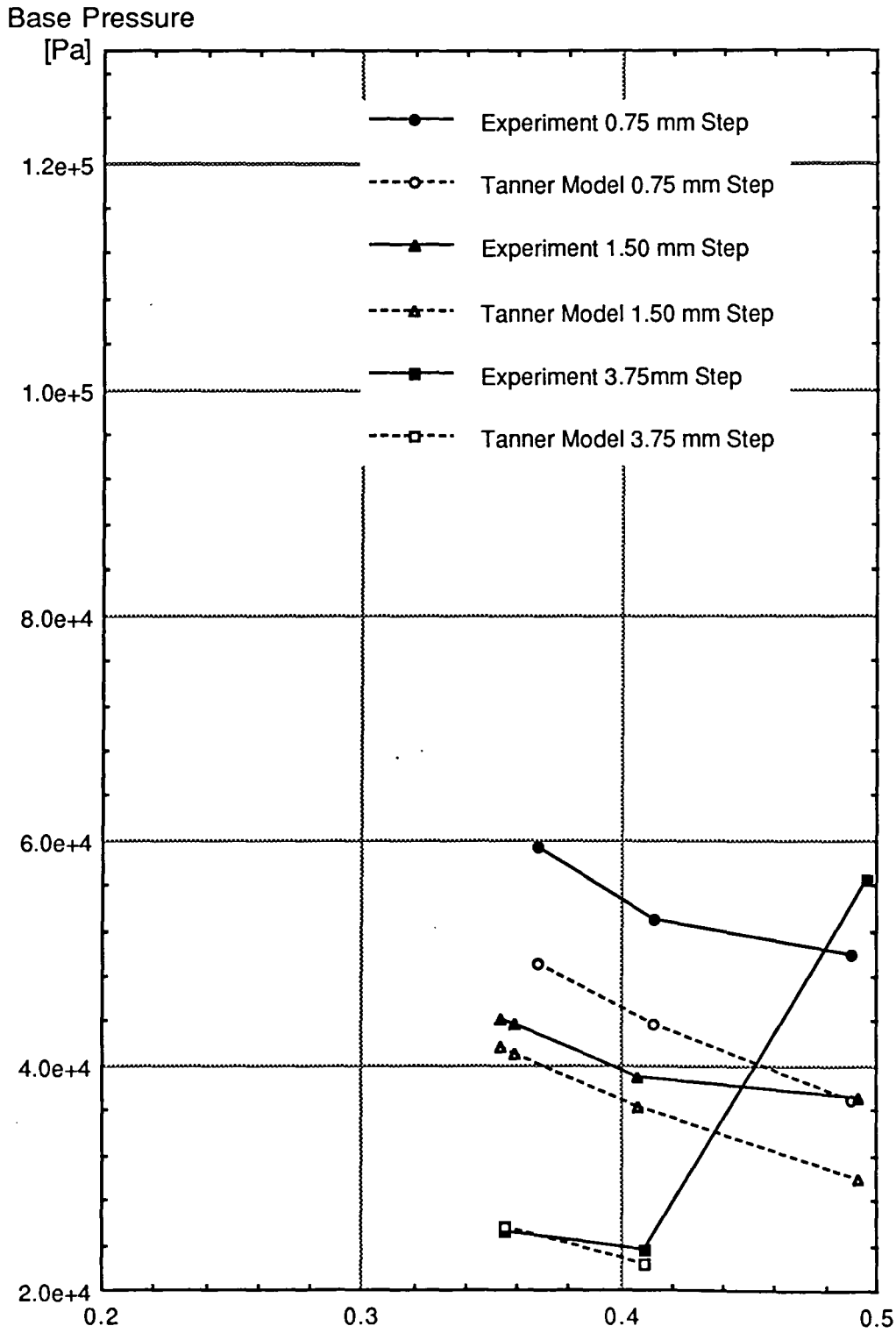

Figure 7.2.4.

Planar Coanda Model
Base Pressures: 8.00 mm Slot

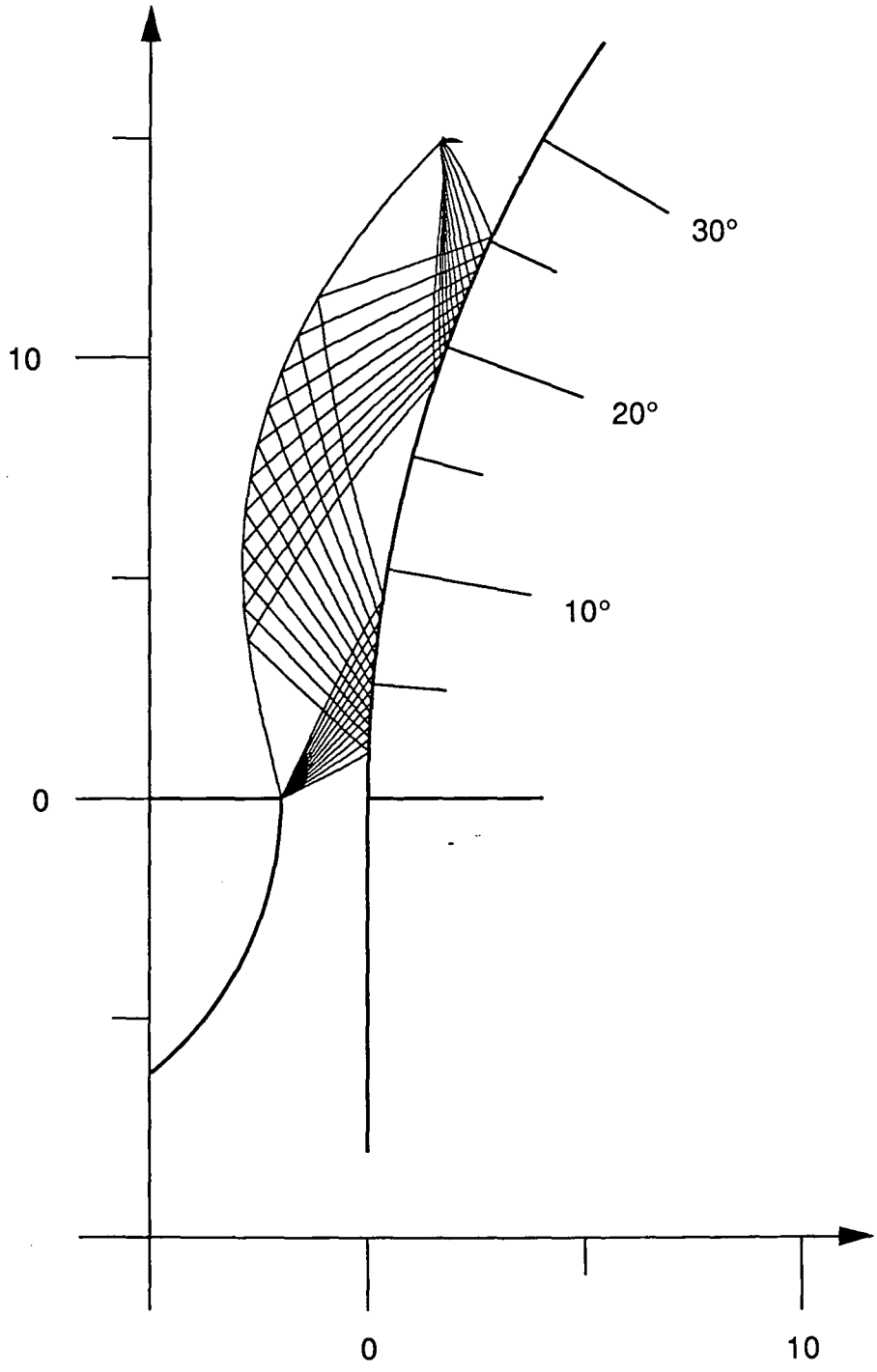

Figure 7.2.5.

Planar Coanda Model
Method of Characteristics Plot

Attached Jet; Shock Fitting
Slot = 2.00 mm Step = 0.00 mm
Patm/Po = 0.243

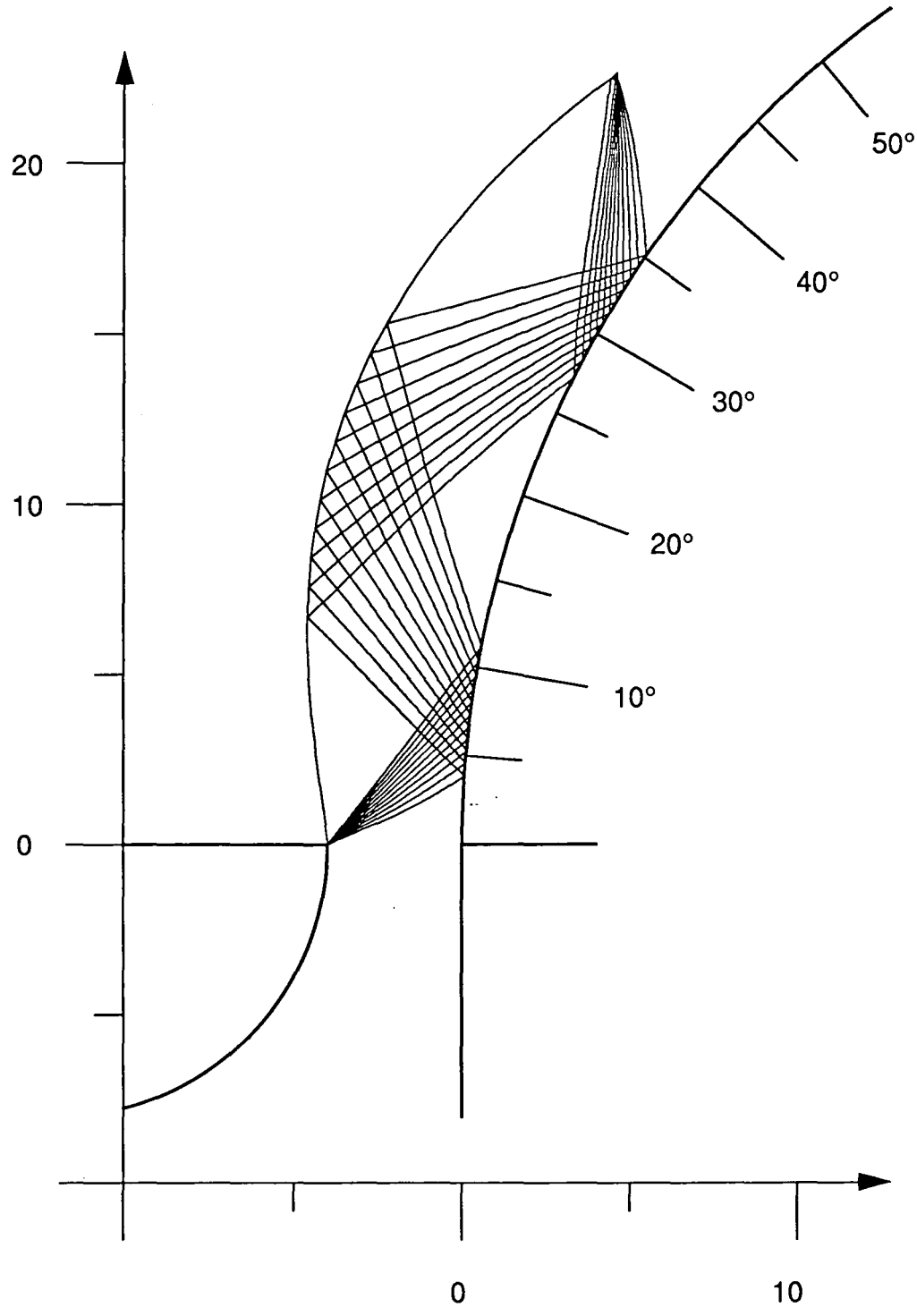

Figure 7.2.6.

Planar Coanda Model
Method of Characteristics Plot
Shock Fitting
Slot = 4.00 mm Step = 0.00 mm
Patm/Po = 0.324

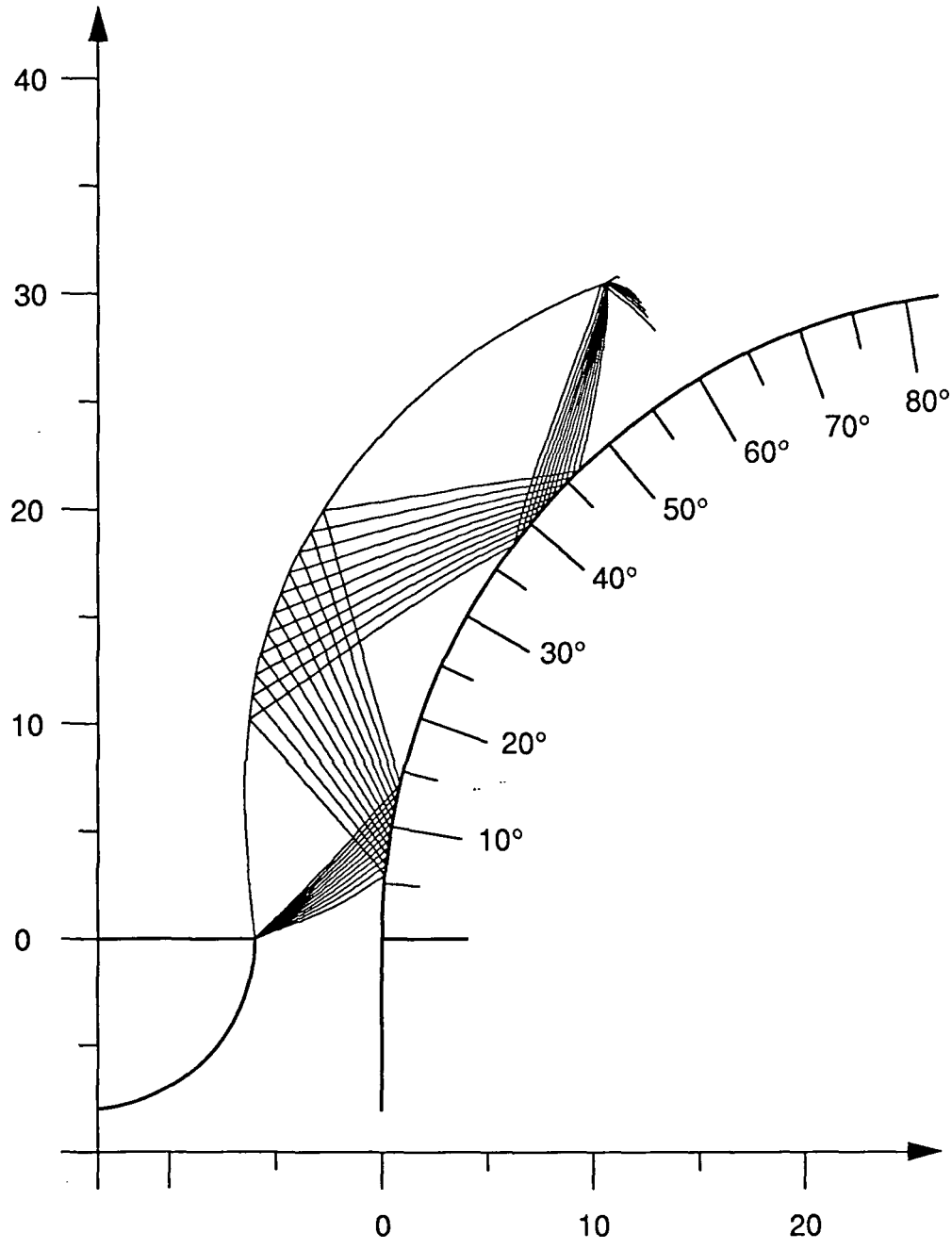

Figure 7.2.7.

Planar Coanda Model
Method of Characteristics Plot
Shock Fitting
Slot = 6.00 mm Step = 0.00 mm
Patm/Po = 0.366

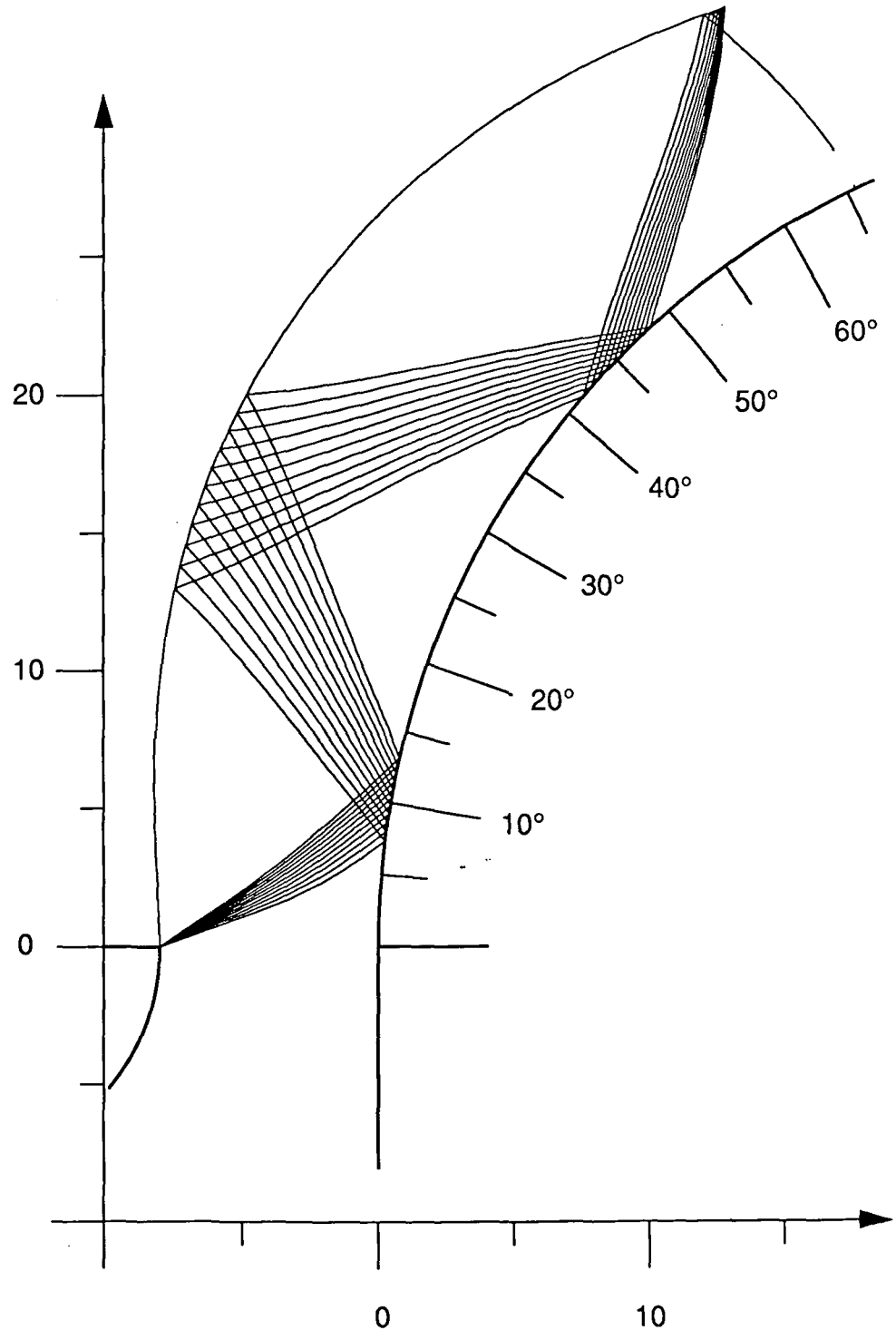

Figure 7.2.8. Planar Coanda Model
Method of Characteristics Plot
Shock Fitting
Slot = 8.00 mm Step = 0.00 mm
Patm/Po = 0.425

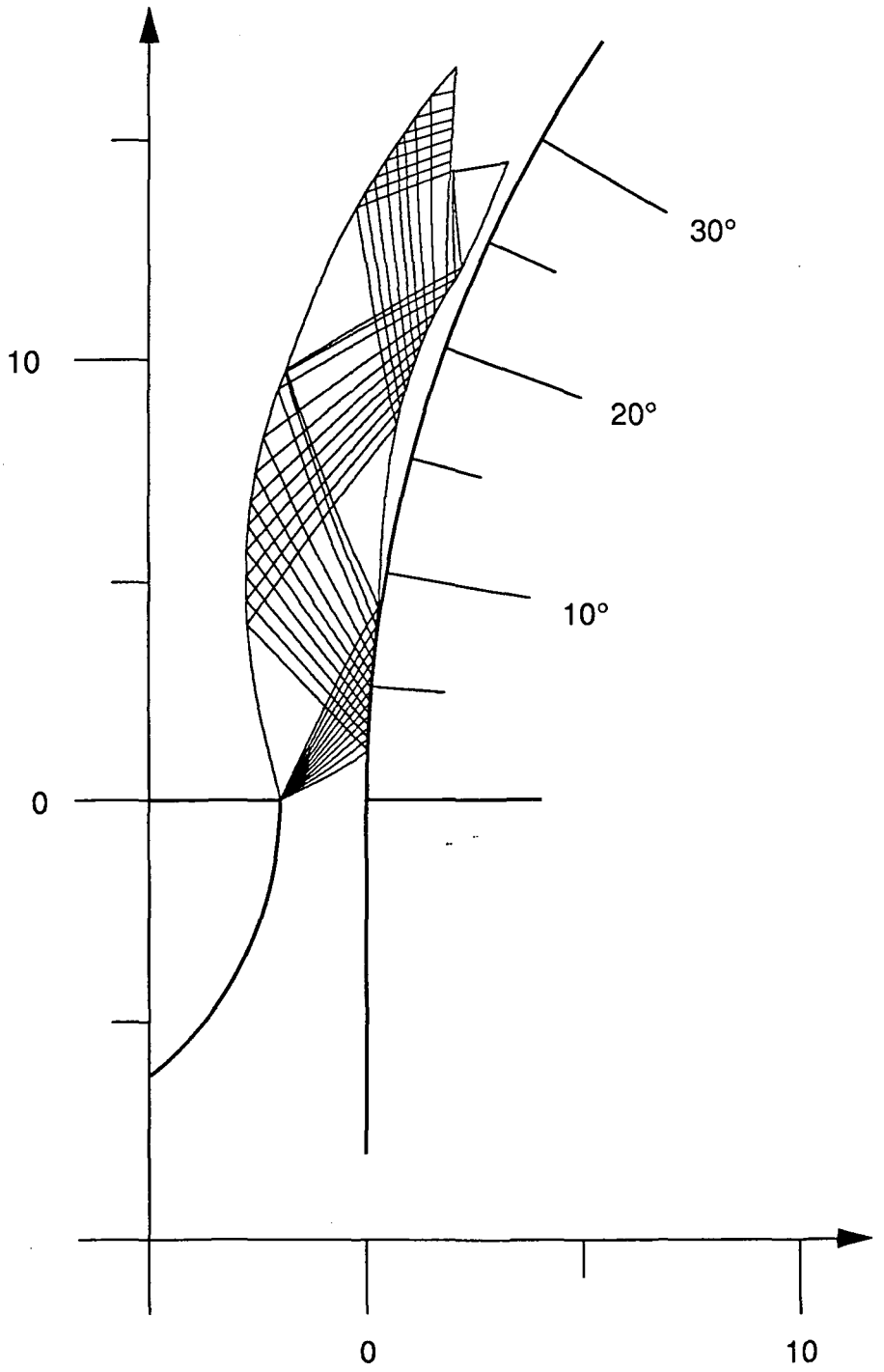

Figure 7.2.9. Planar Coanda Model
Method of Characteristics Plot
Shock Fitting; Experimental Surface Pressures
Slot = 2.00 mm Step = 0.00 mm
Patm/Po = 0.243

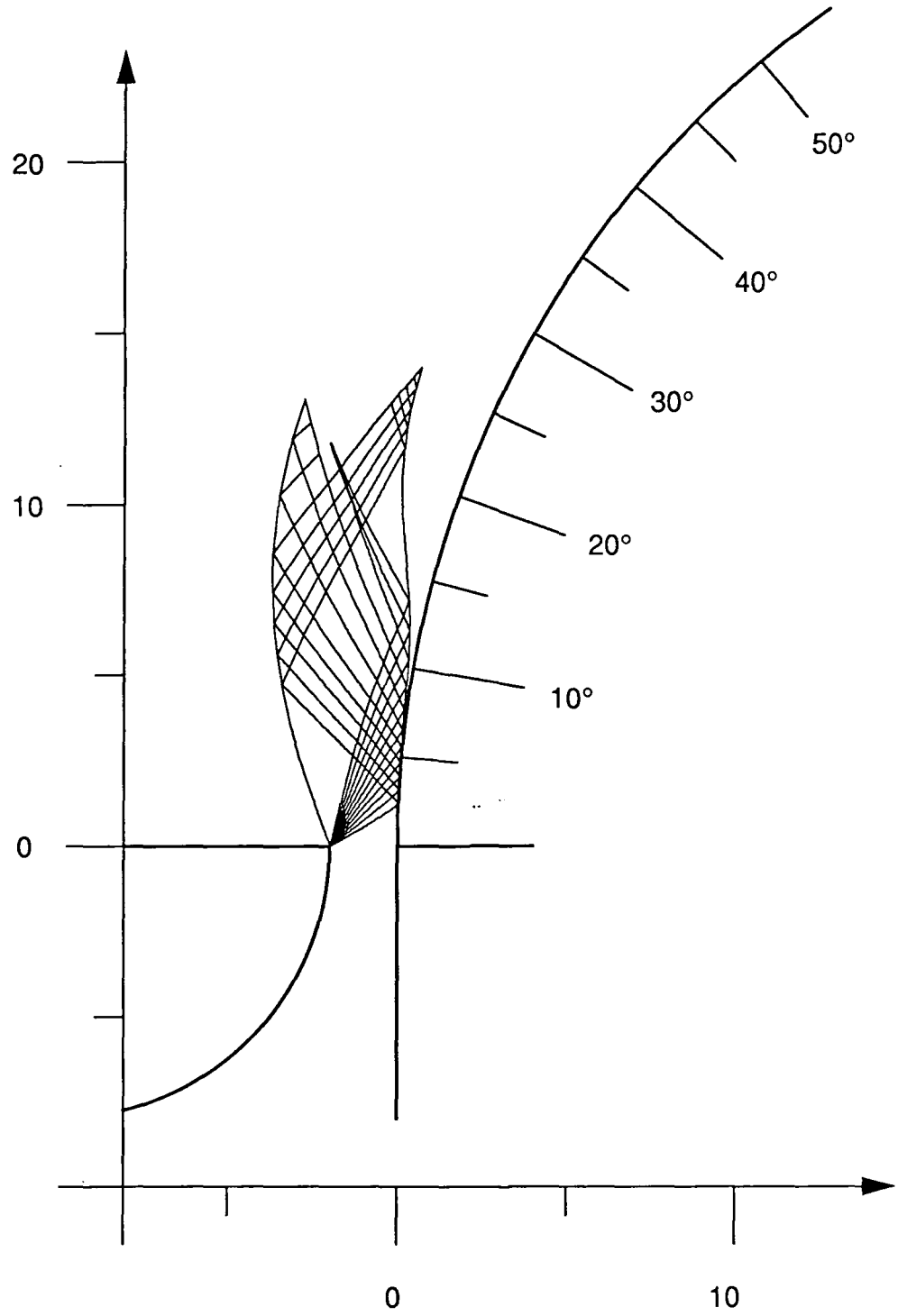

Figure 7.2.10. Planar Coanda Model
Method of Characteristics Plot
Shock Fitting; Experimental Surface Pressures
Slot = 2.00 mm Step = 0.00 mm
Patm/Po = 0.176

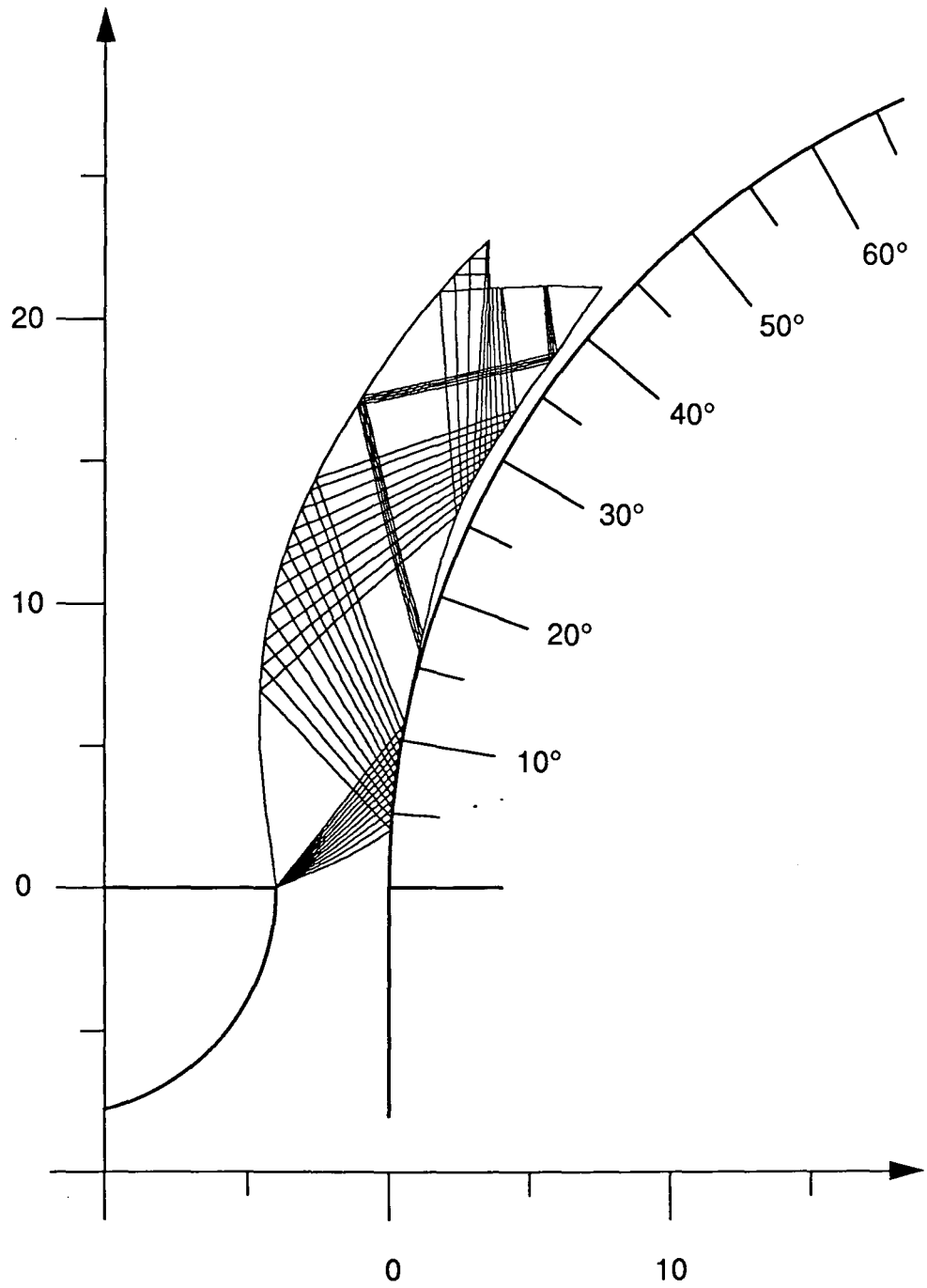

Figure 7.2.11.

Planar Coanda Model
Method of Characteristics Plot
Shock Fitting; Experimental Surface Pressures
Slot = 4.00 mm Step = 0.00 mm
Patm/Po = 0.324

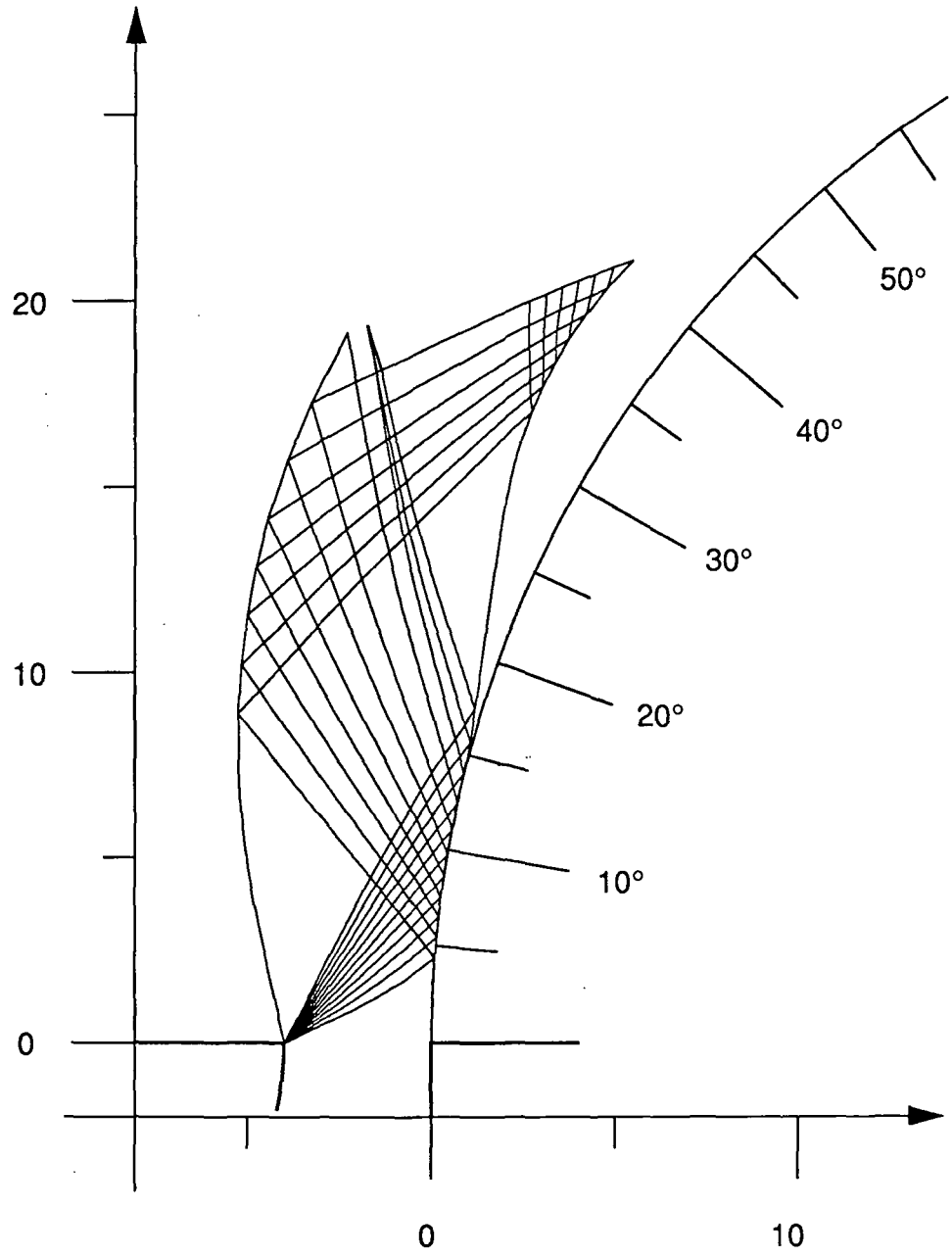

Figure 7.2.12.

Planar Coanda Model
Method of Characteristics Plot
Shock Fitting; Experimental Surface Pressures
Slot = 4.00 mm Step = 0.00 mm
Patm/Po = 0.256

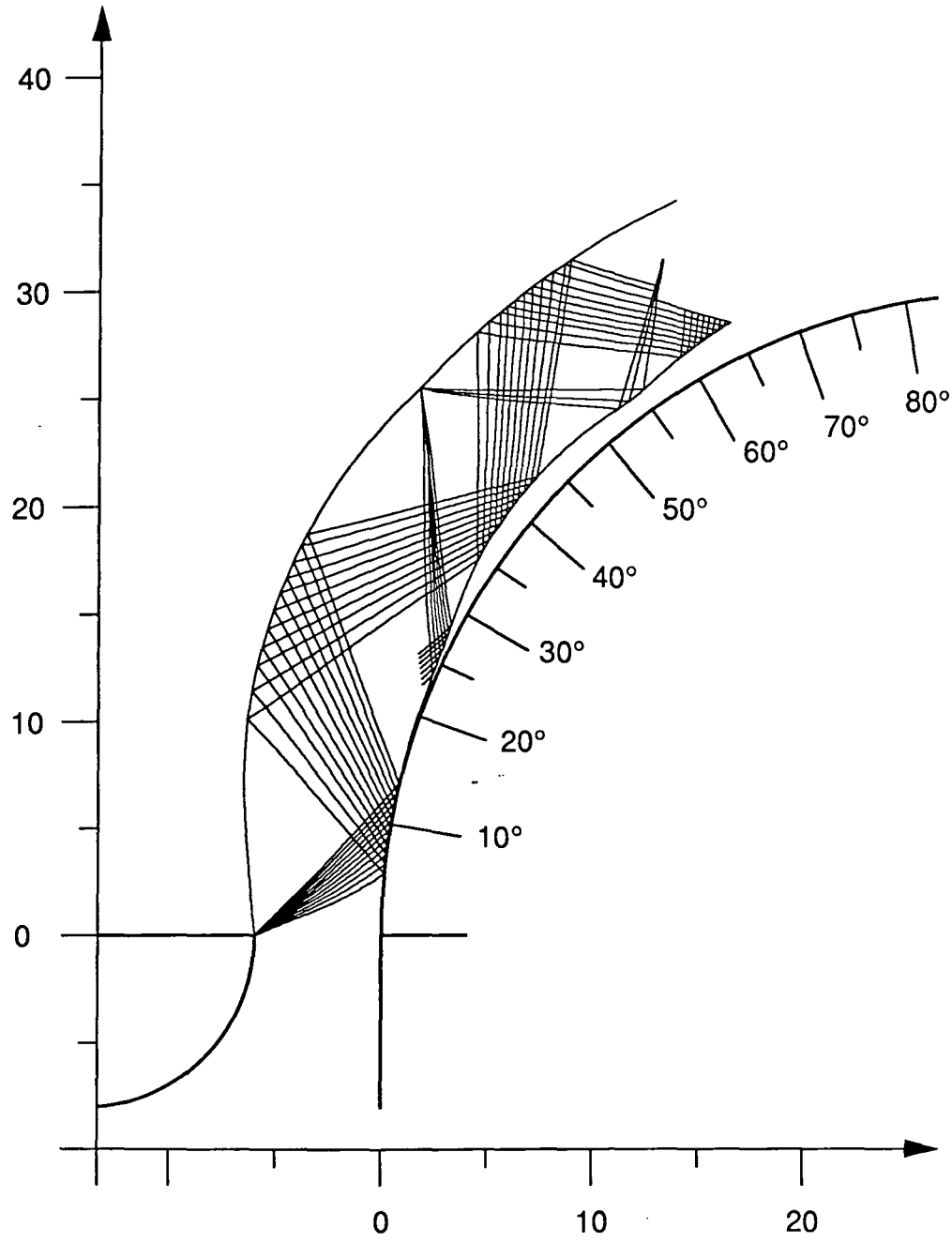

Figure 7.2.13.

Planar Coanda Model
Method of Characteristics Plot
Shock Fitting; Experimental Surface Pressures
Slot = 6.00 mm Step = 0.00 mm
Patm/Po = 0.366

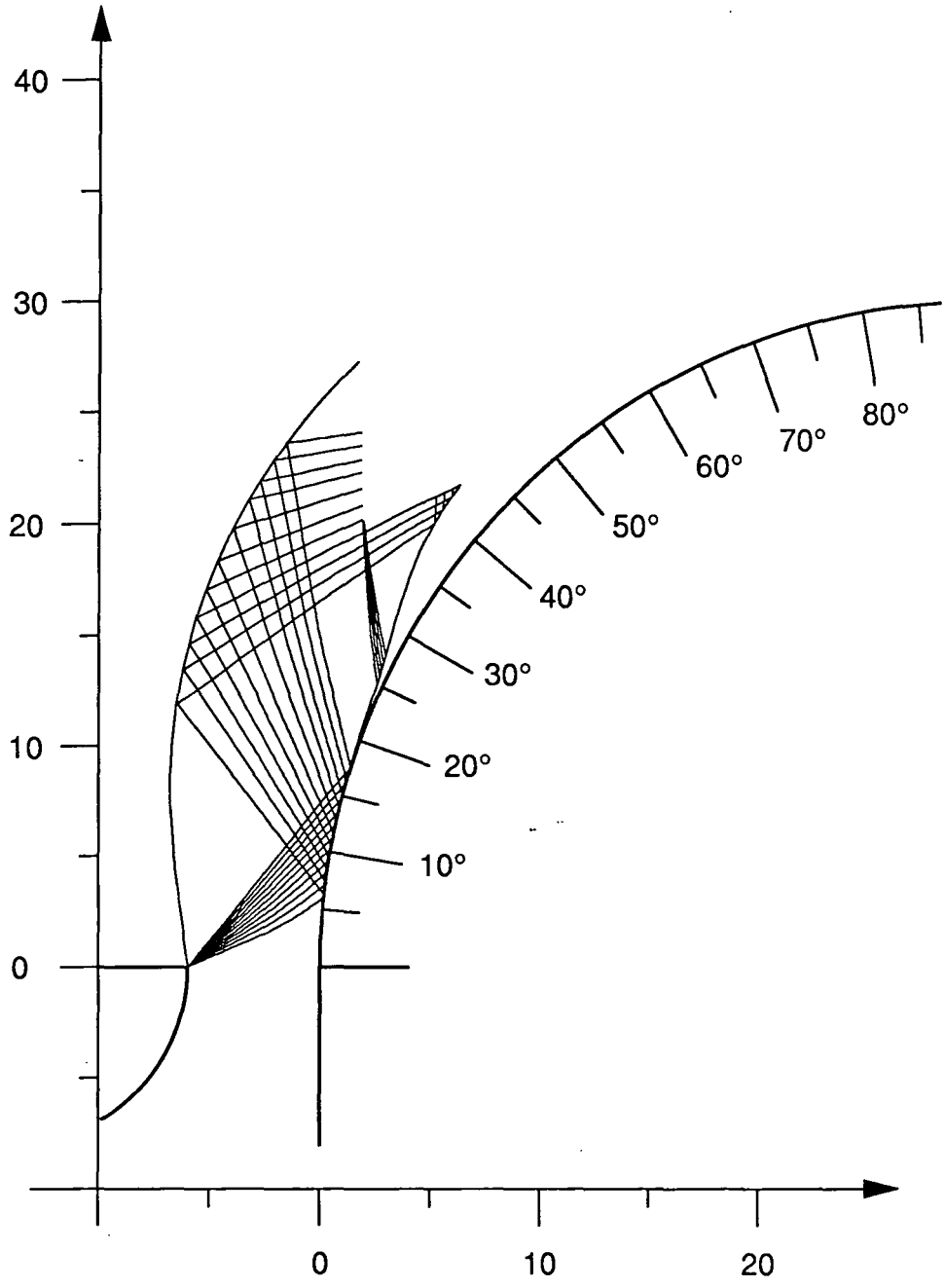

Figure 7.2.14.

Planar Coanda Model
Method of Characteristics Plot
Shock Fitting; Experimental Surface Pressures
Slot = 6.00 mm Step = 0.00 mm
Patm/Po = 0.330

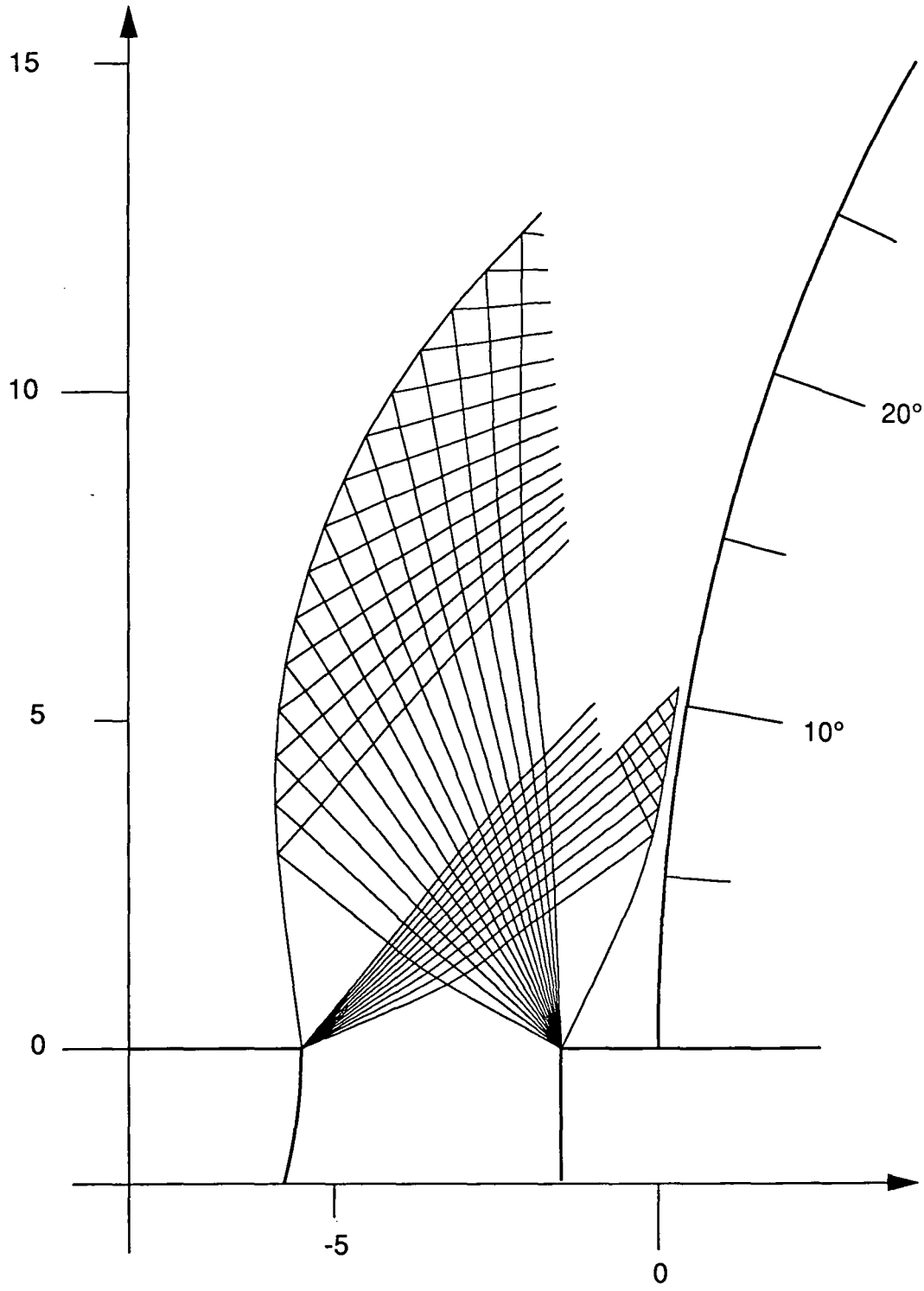

Figure 7.2.15. Planar Coanda Model
Method of Characteristics Plot
Shock Fitting; Experimental Surface Pressures
Slot = 4.00 mm Step = 1.50 mm
Patm/Po = 0.331

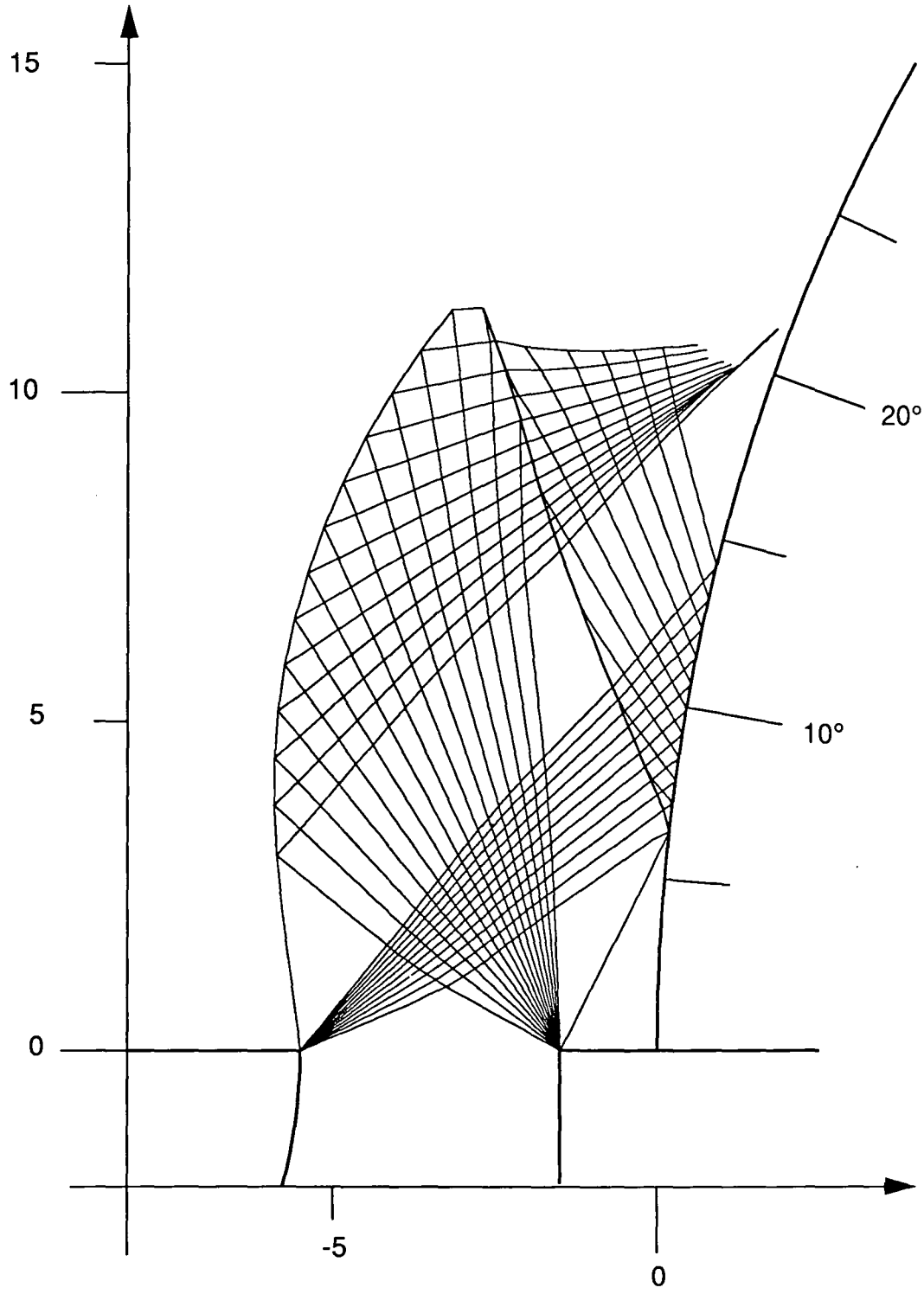

Figure 7.2.16. Planar Coanda Model
Method of Characteristics Plot
Shock Fitting; Separation Model
Experimental Base Pressure
Slot = 4.00 mm Step = 1.50 mm
Patm/Po = 0.331

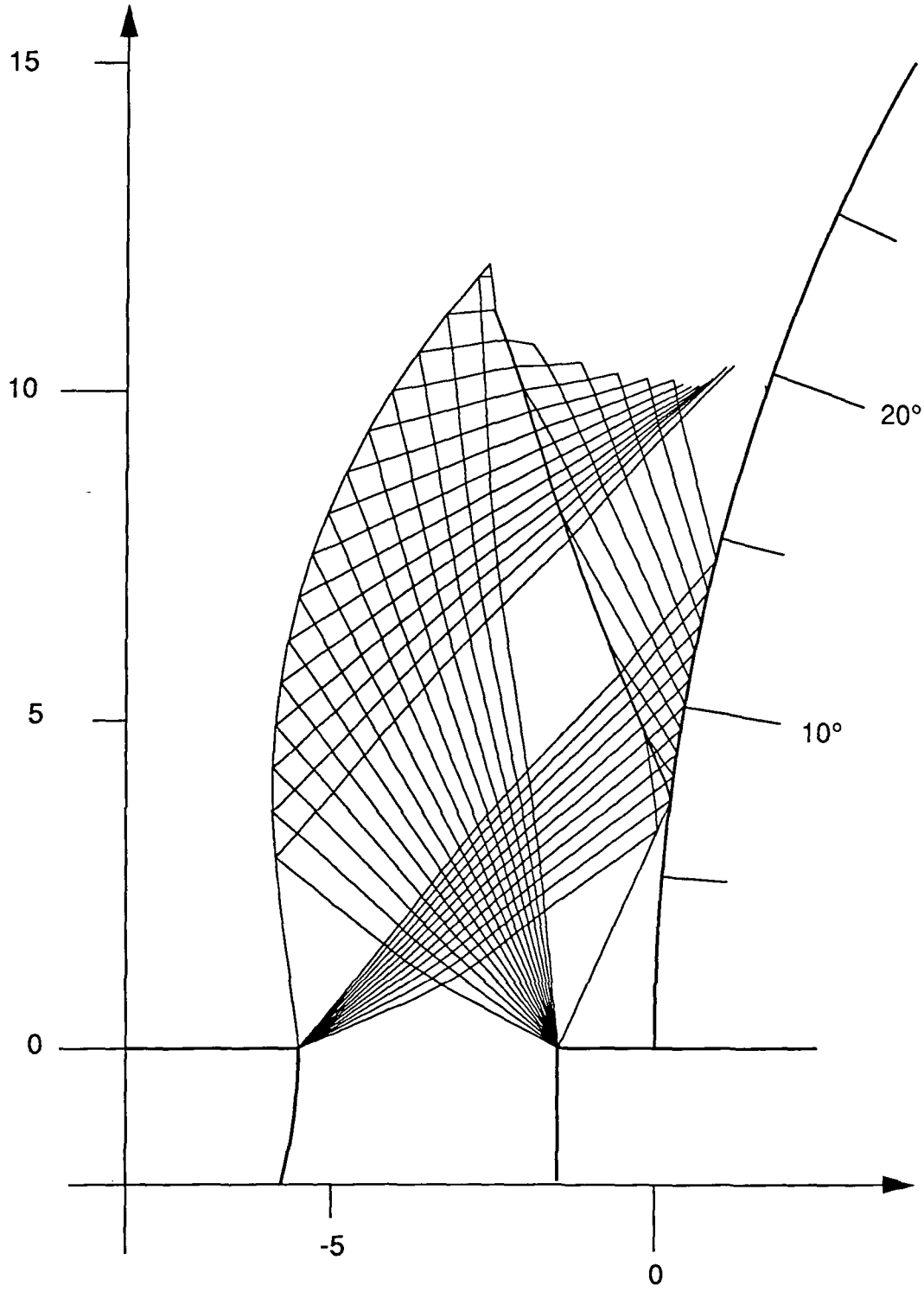

Figure 7.2.17. Planar Coanda Model
Method of Characteristics Plot
Shock Fitting; Separation Model
Base Pressure Model
Slot = 4.00 mm Step = 1.50 mm
Patm/Po = 0.331

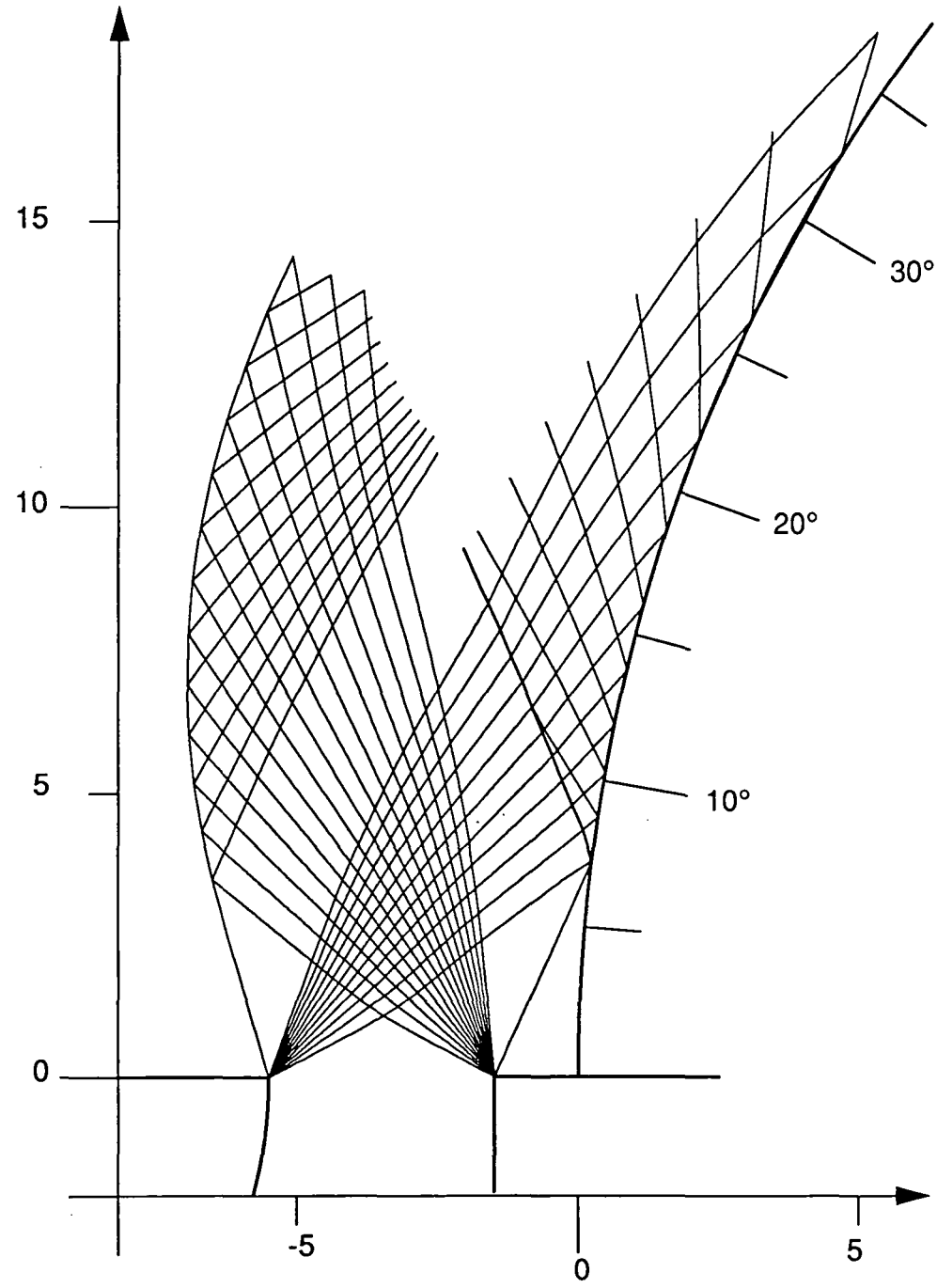

Figure 7.2.18. Planar Coanda Model
Method of Characteristics Plot
Shock Fitting; Separation Model
Base Pressure Model
Slot = 4.00 mm Step = 1.50 mm
Patm/Po = 0.212

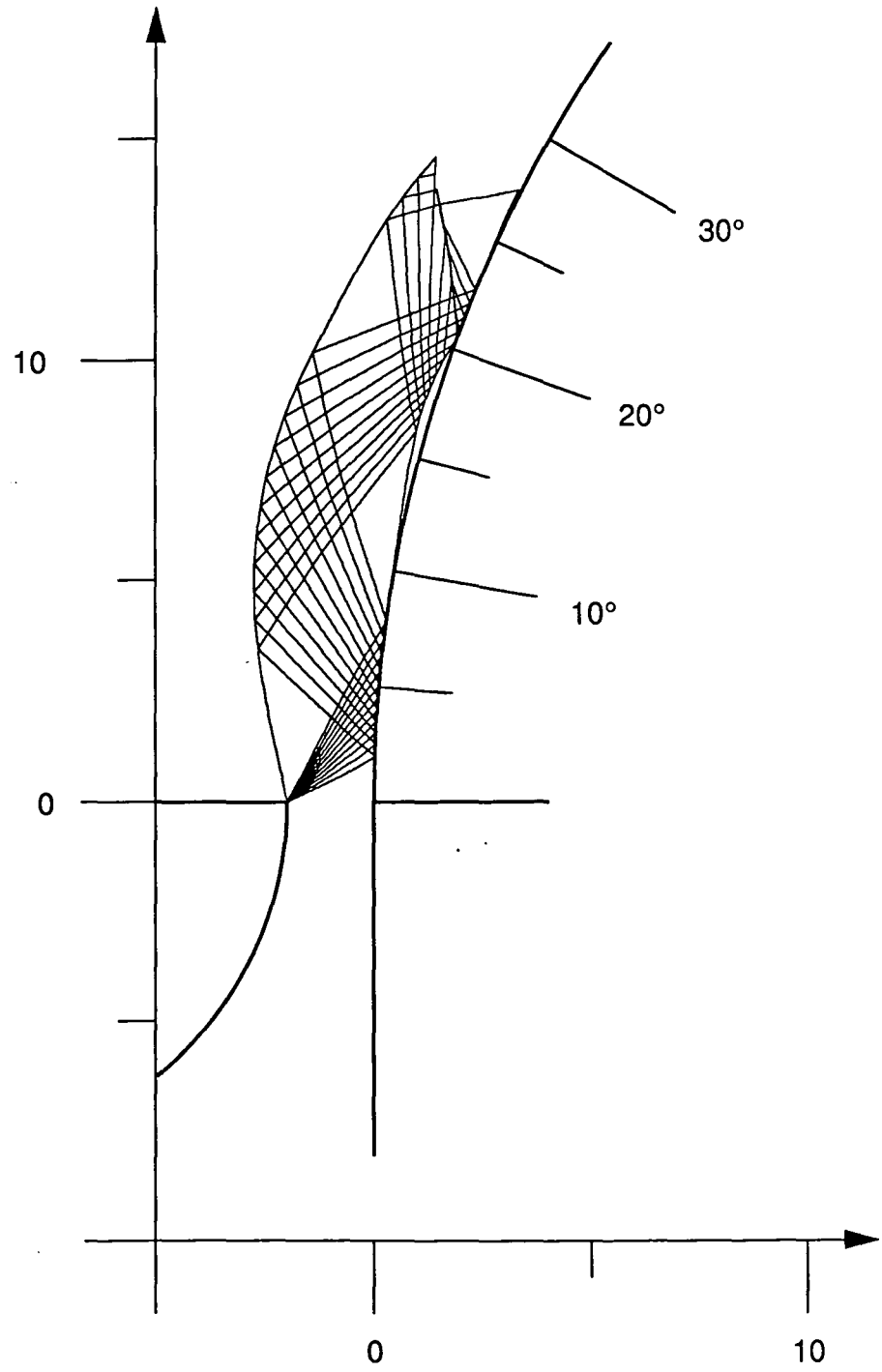

Figure 7.2.19.

Planar Coanda Model
Method of Characteristics Plot

Shock Fitting; Separation Model
Slot = 2.00 mm Step = 0.00 mm
Patm/Po = 0.258

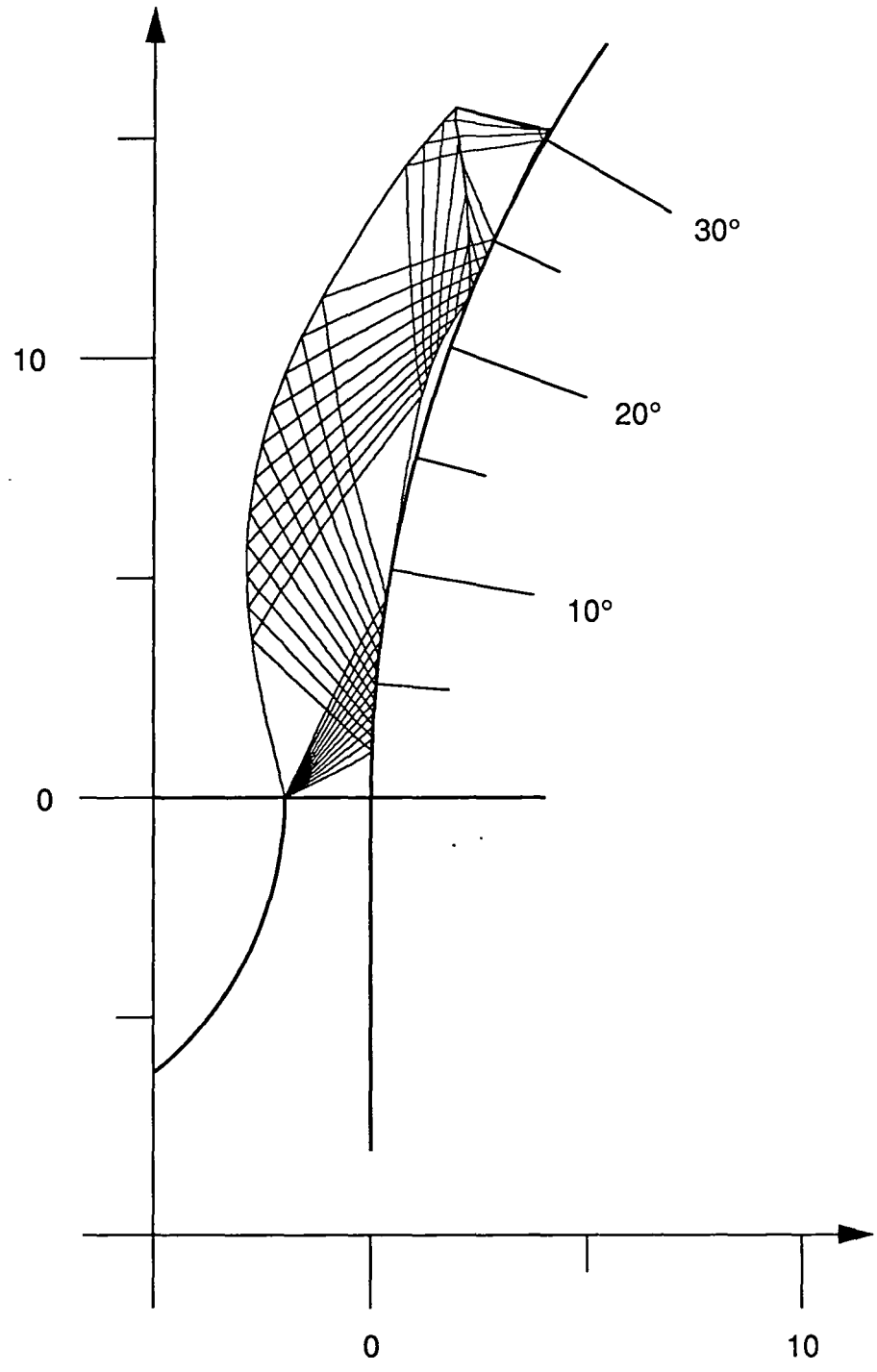

Figure 7.2.20.

Planar Coanda Model
Method of Characteristics Plot
Shock Fitting;Separation Model
Step = 2.00mm Slot = 0.00mm
Patm/Po = 0.243

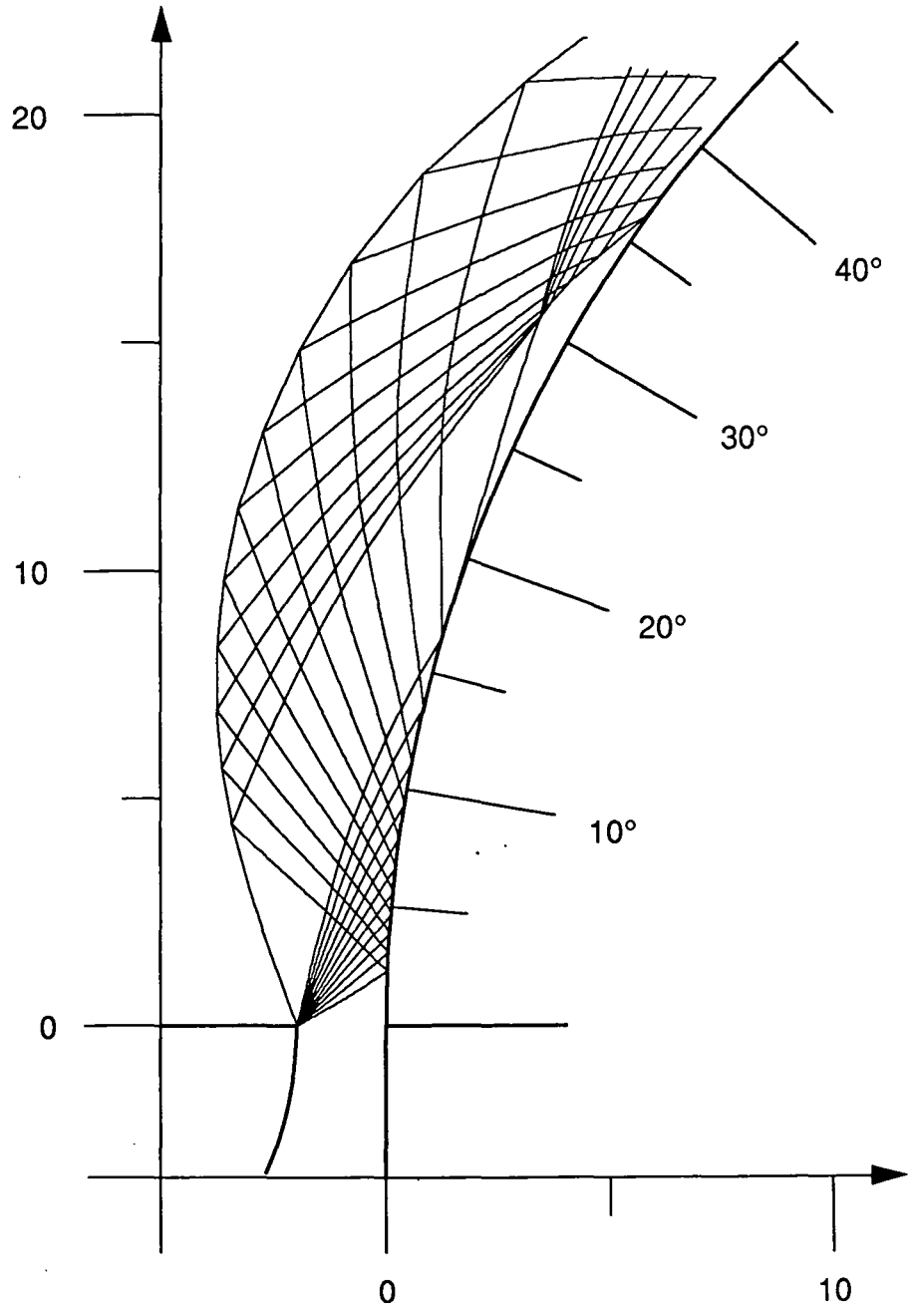

Figure 7.2.21.

Planar Coanda Model
Method of Characteristics Plot
Shock Fitting; Separation Model
Slot = 2.00 mm Step = 0.00 mm
Patm/Po = 0.176

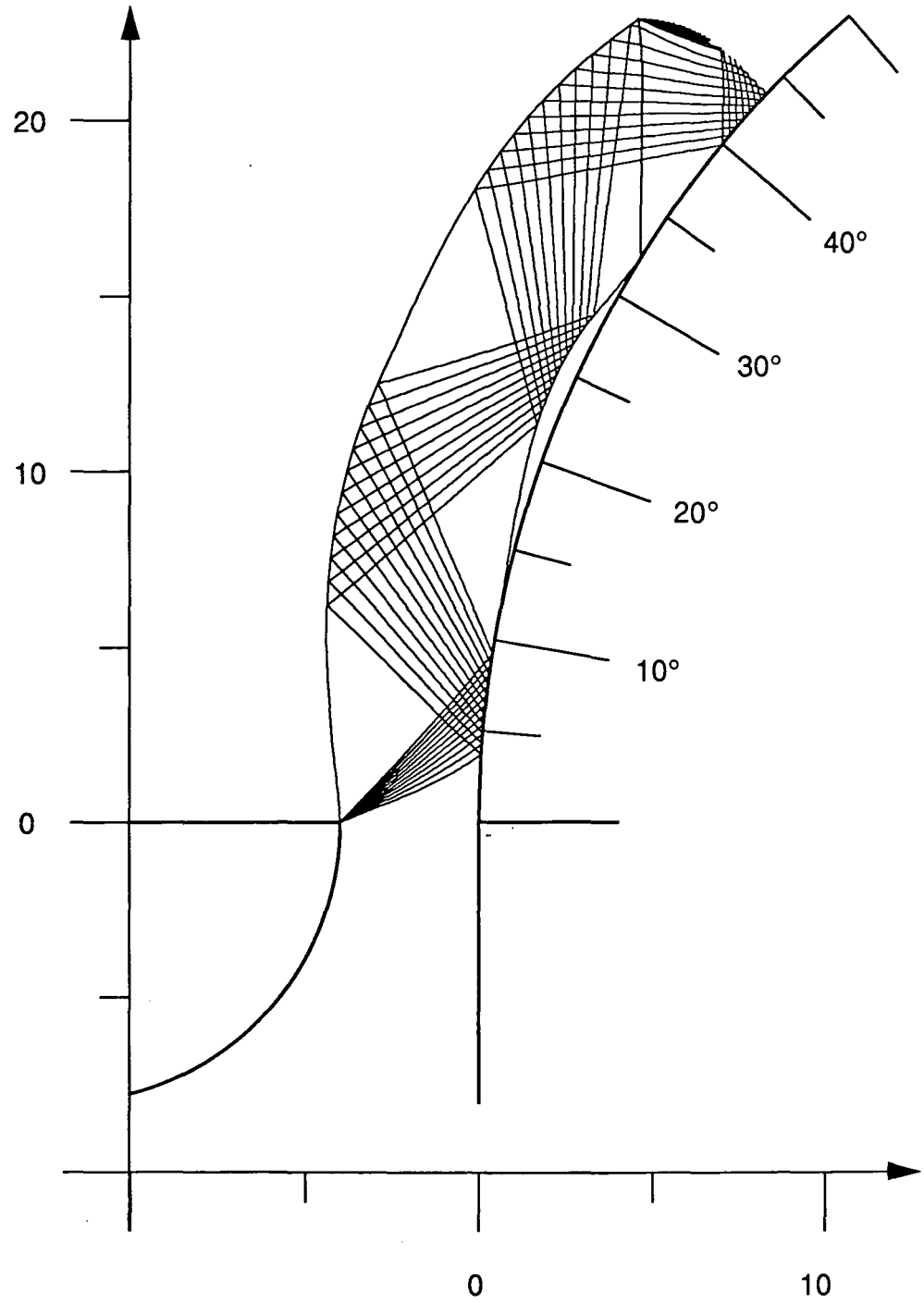

Figure 7.2.22.

Planar Coanda Model
Method of Characteristics Plot
Shock Fitting; Separation Model
Slot = 4.00 mm Step = 0.00 mm
Patm/Po = 0.355

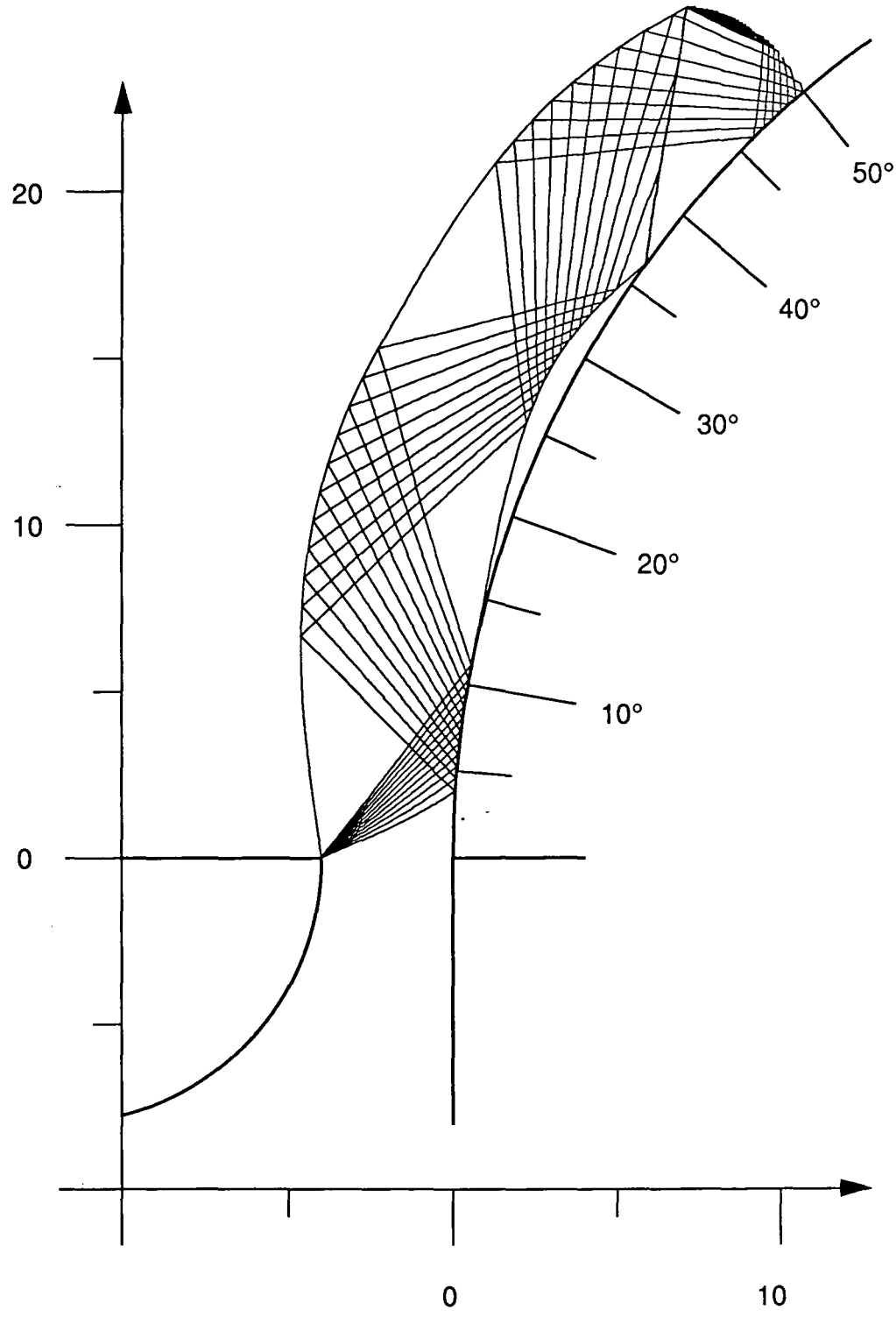

Figure 7.2.23.

Planar Coanda Model
Method of Characteristics Plot
Shock Fitting; Separation Model
Slot = 4.00 mm Step = 0.00 mm
Patm/Po = 0.324

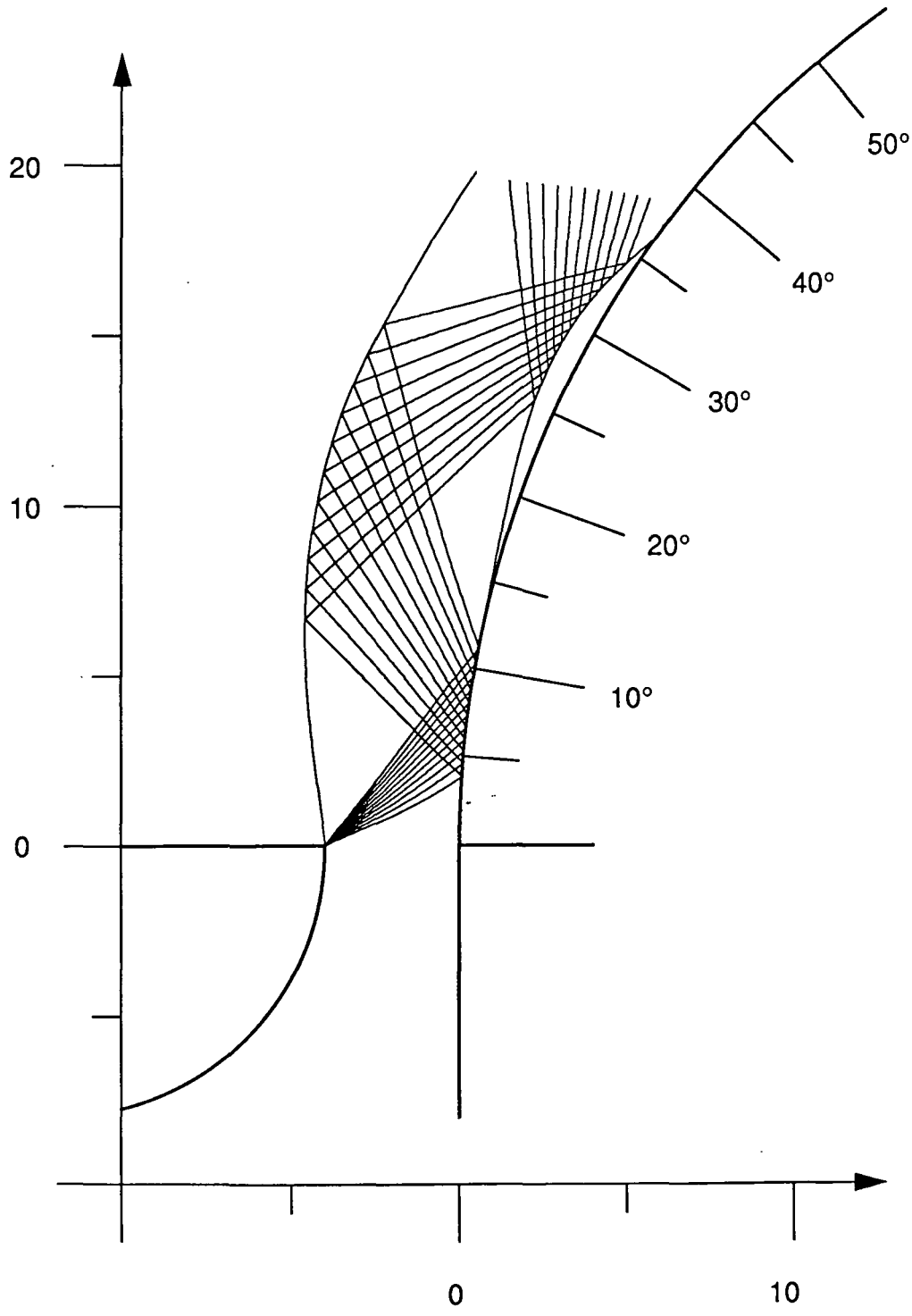

Figure 7.2.24.

Planar Coanda Model
Method of Characteristics Plot
Separation Model
Slot = 4.00 mm Step = 0.00 mm
Patm/Po = 0.324

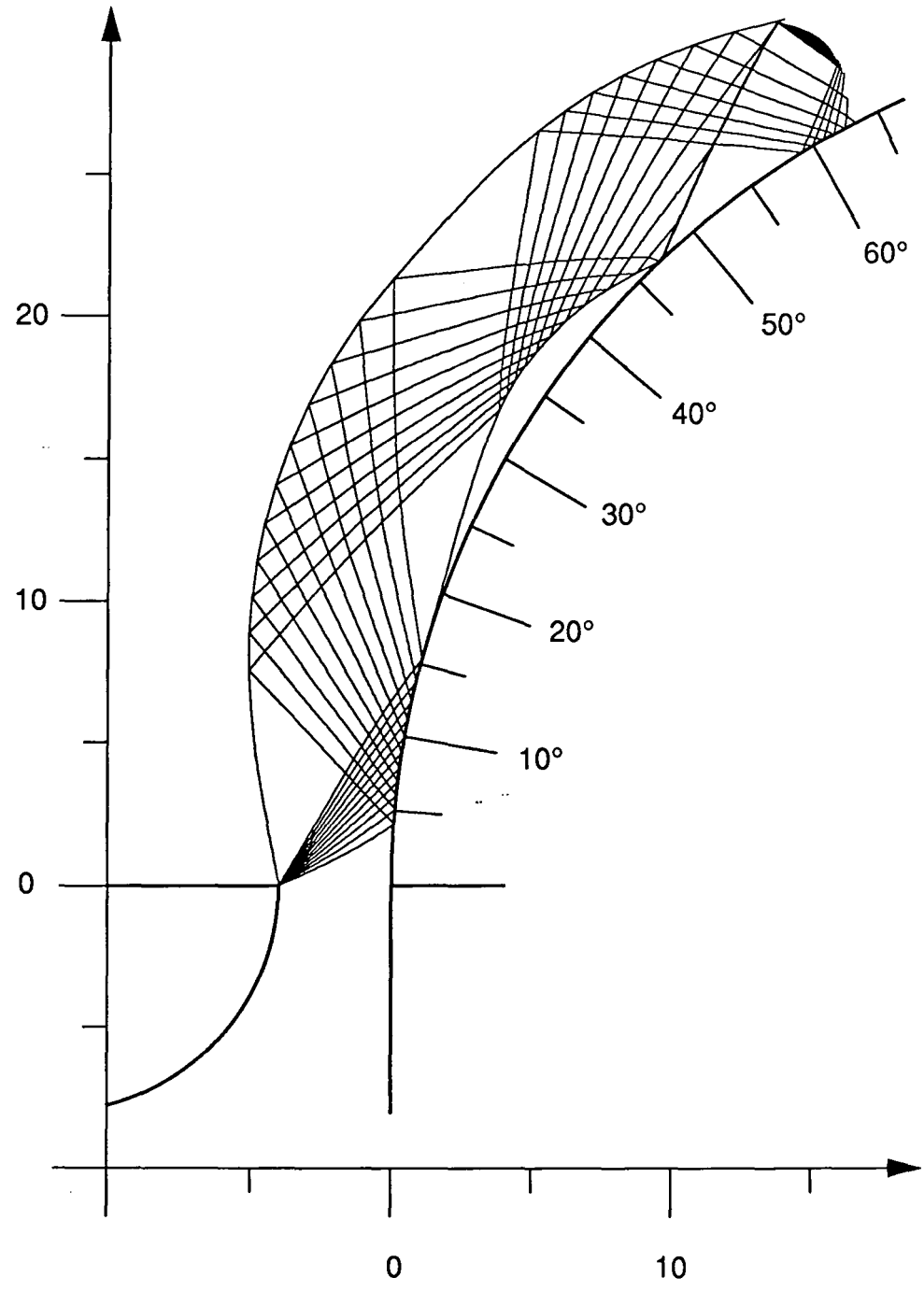

Figure 7.2.25.

Planar Coanda Model
Method of Characteristics Plot
Shock Fitting; Separation Model
Slot = 4.00 mm Step = 0.00 mm
Patm/Po = 0.277

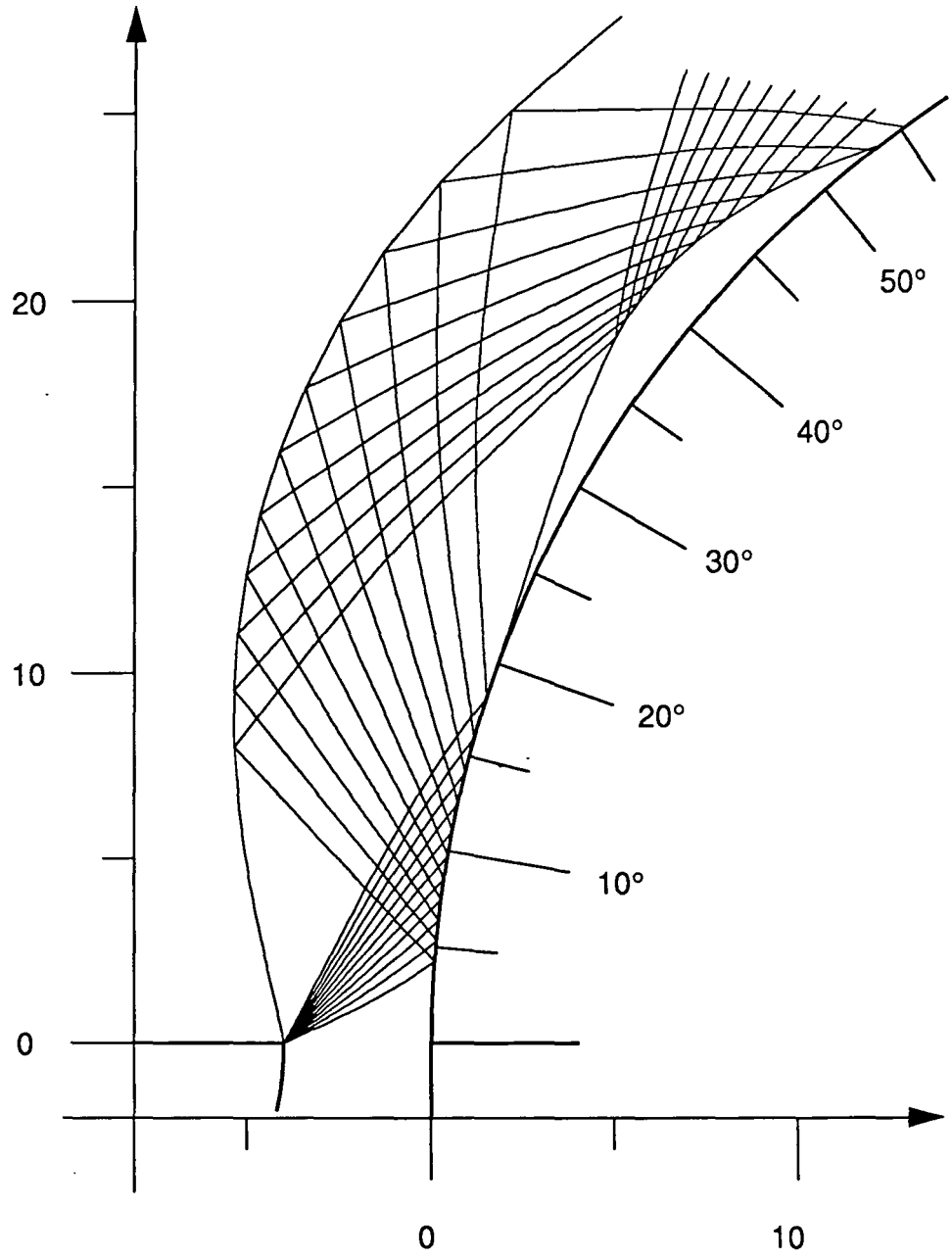

Figure 7.2.26.

Planar Coanda Model
Method of Characteristics Plot

Shock Fitting; Separation Model
Slot = 4.00 mm Step = 0.00 mm
Patm/Po = 0.256

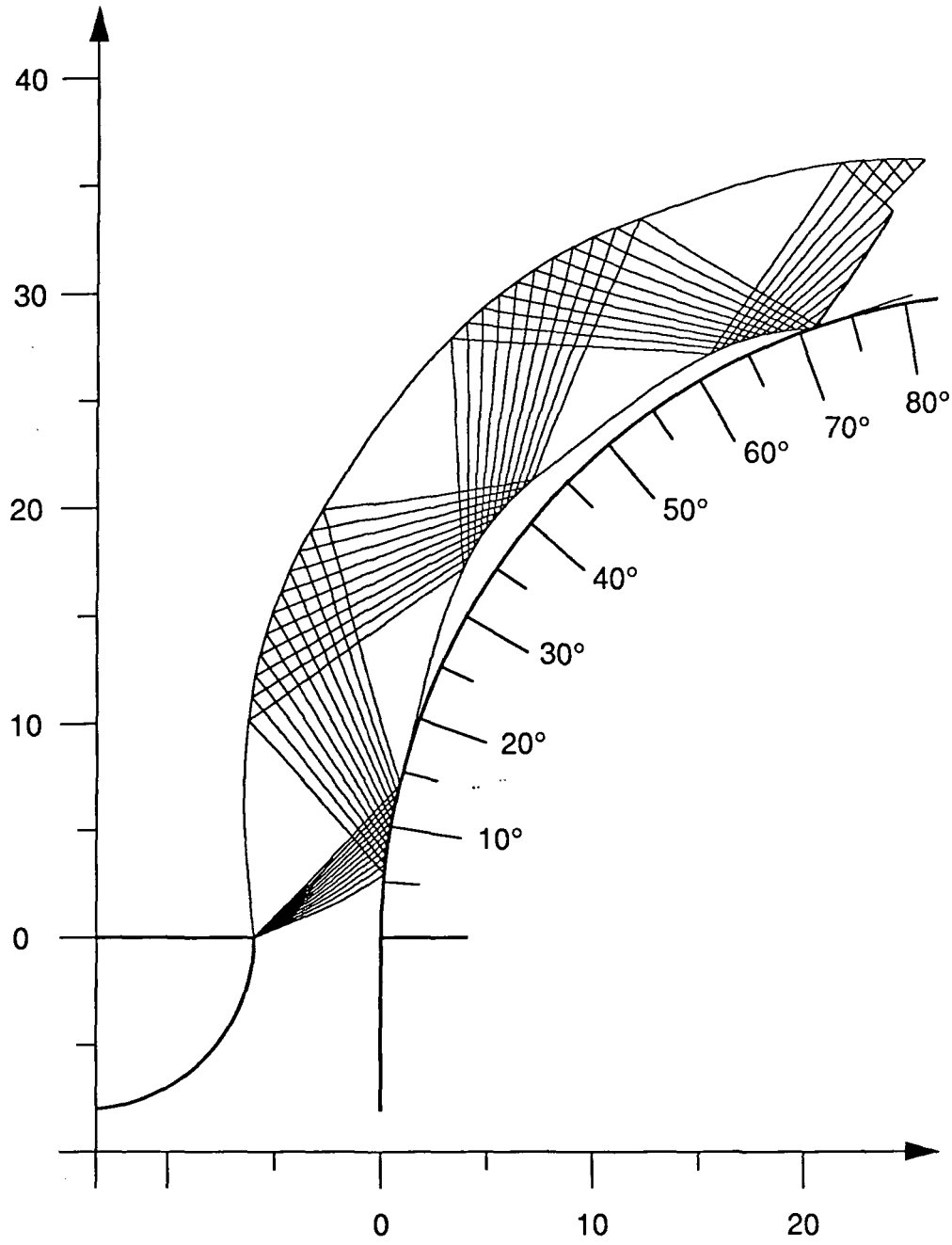

Figure 7.2.27.

Planar Coanda Model
Method of Characteristics Plot
Shock Fitting; Separation Model
Slot = 6.00 mm Step = 0.00 mm
Patm/Po = 0.366

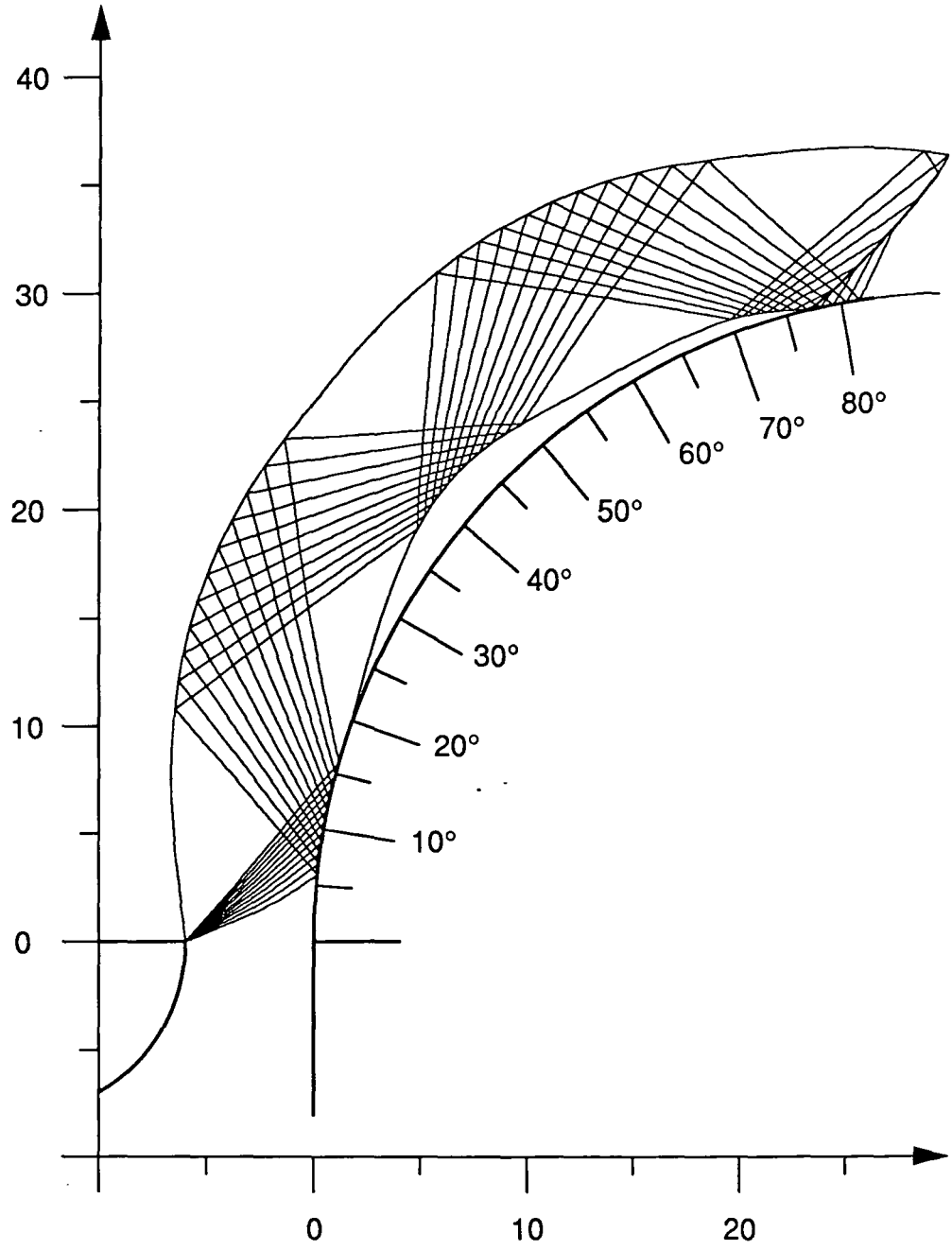

Figure 7.2.28. Planar Coanda Model
Method of Characteristics Plot
Shock Fitting; Separation Model
Slot = 6.00 mm Step = 0.00 mm
Patm/Po = 0.343

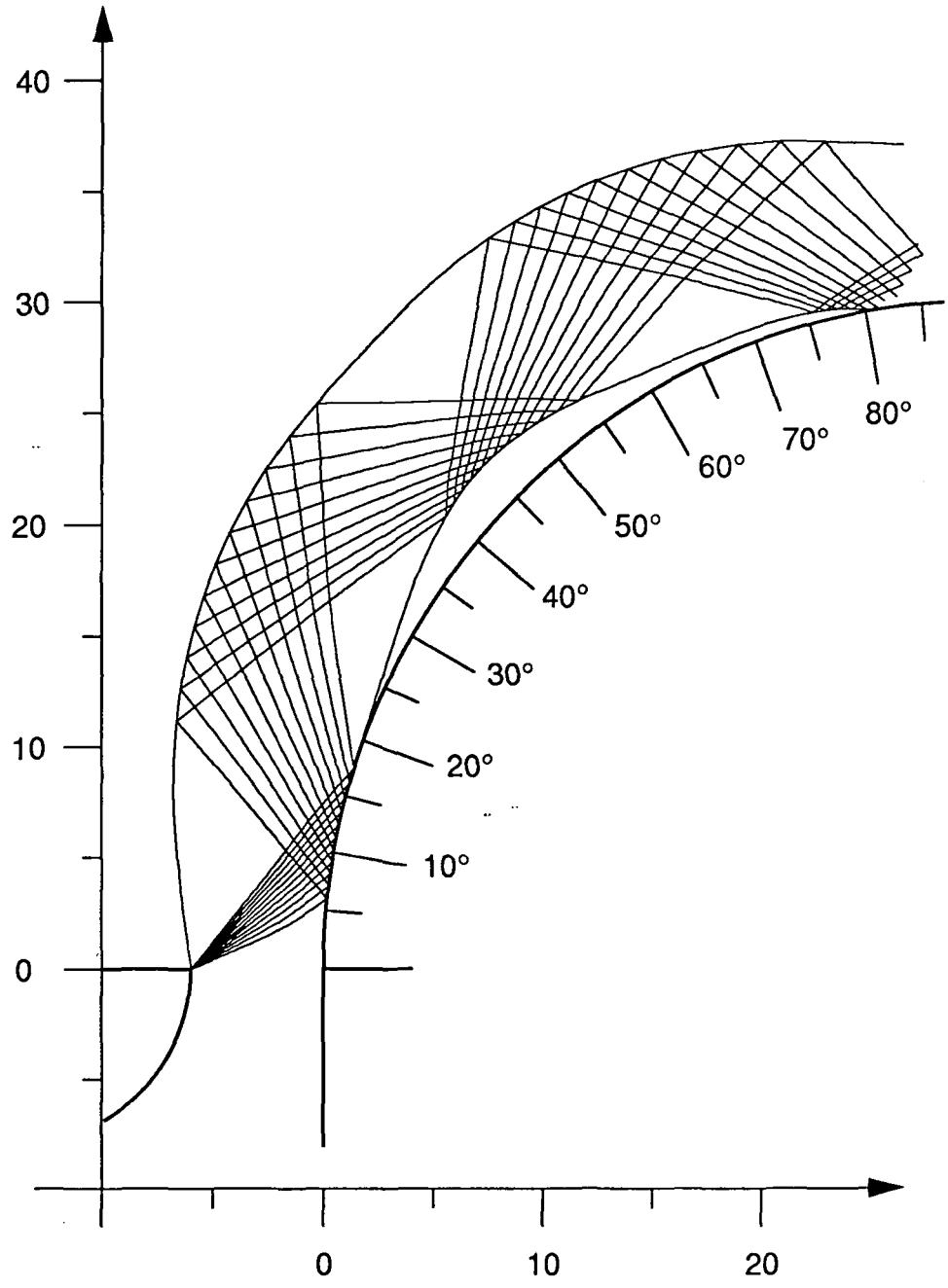

Figure 7.2.29.

Planar Coanda Model
Method of Characteristics Plot

Shock Fitting; Separation Model
Slot = 6.00 mm Step = 0.00 mm
Patm/Po = 0.330

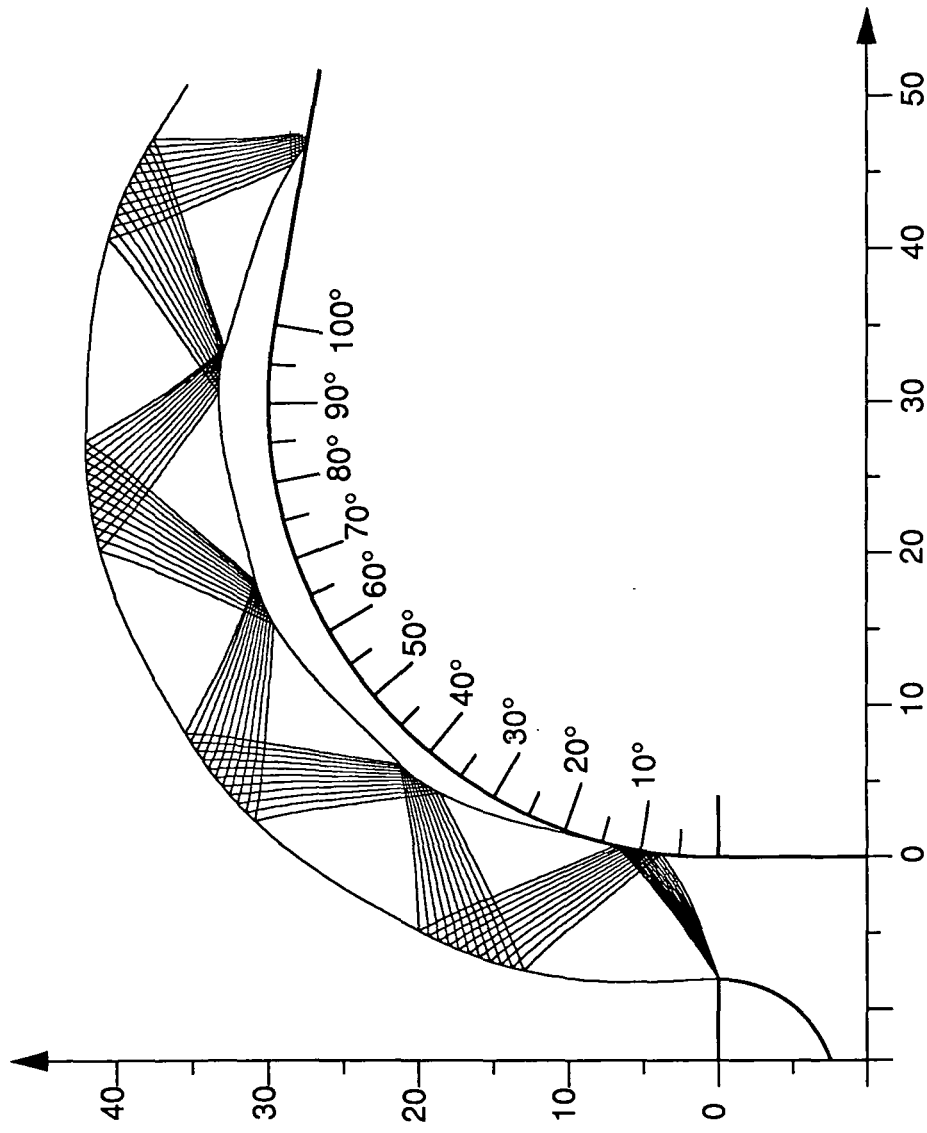

Figure 7.2.30.

Planar Coanda Model
Method of Characteristics Plot
Shock Fitting; Separation Model
Slot = 8.00 mm Step = 0.00 mm
Patm/Po = 0.425

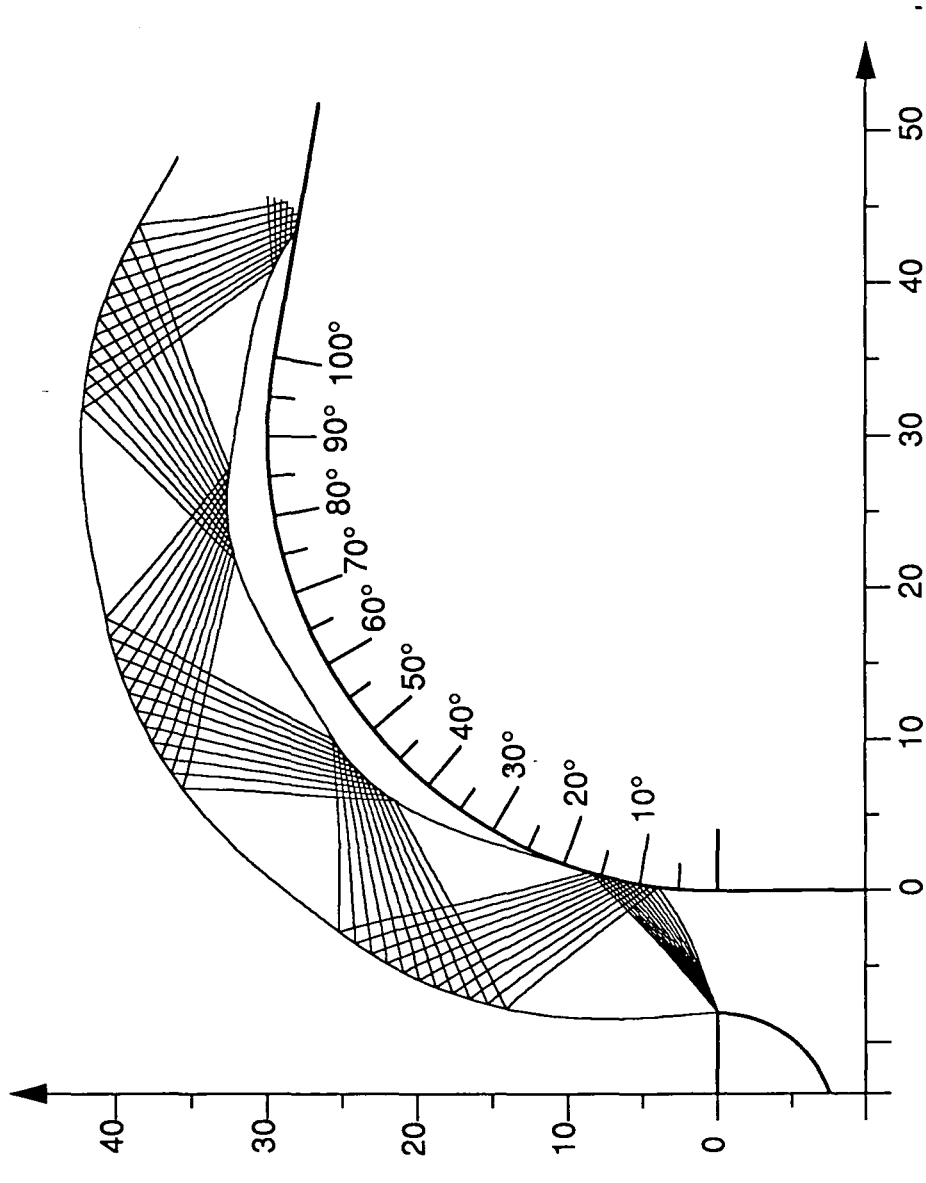

Figure 7.2.31.

Planar Coanda Model
Method of Characteristics Plot

Shock Fitting; Separation Model
Slot = 8.00 mm Step = 0.00 mm
Patm/Po = 0.391

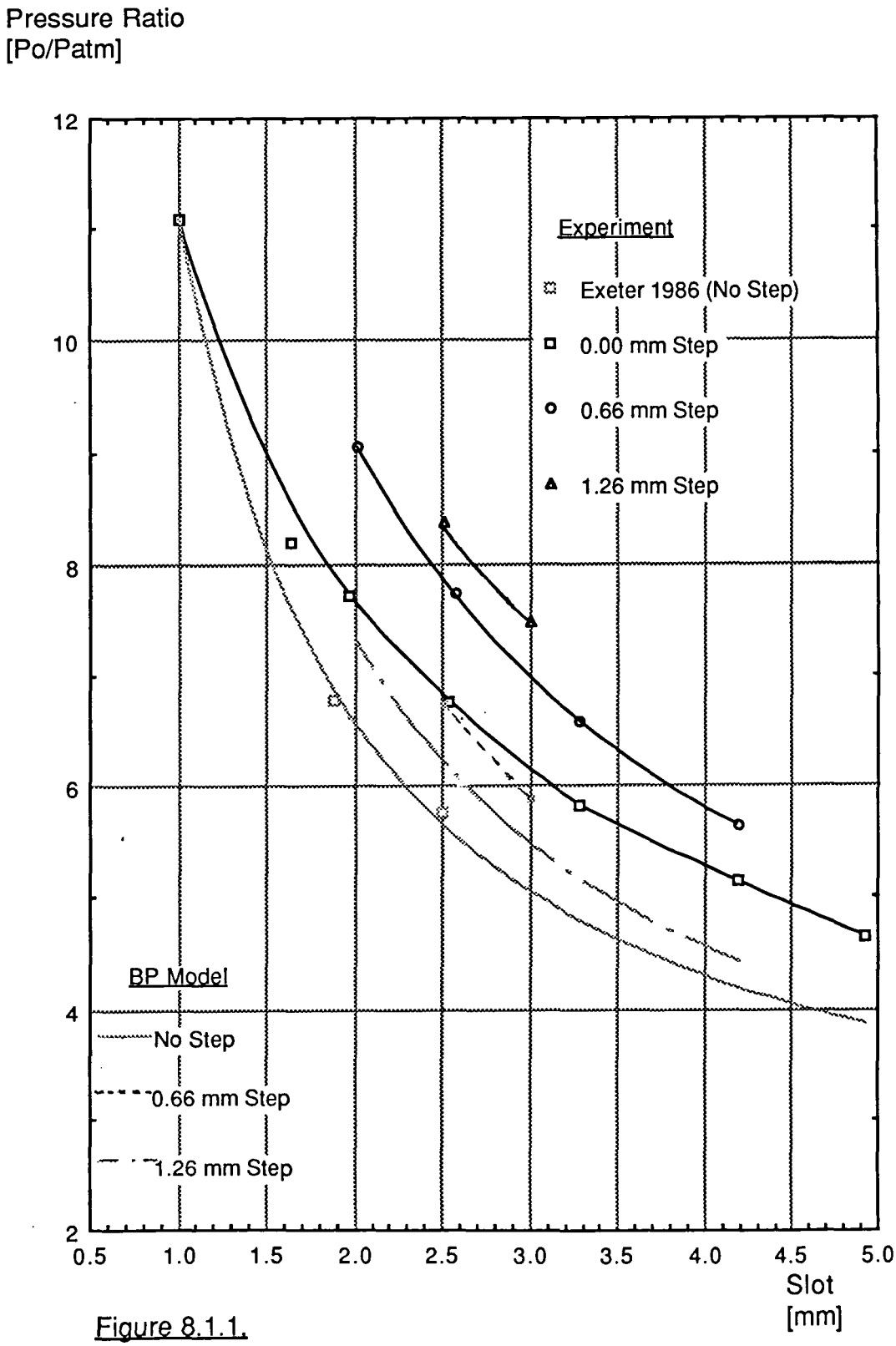

Figure 8.1.1.

Axisymmetric Coanda Model
Breakaway Performance

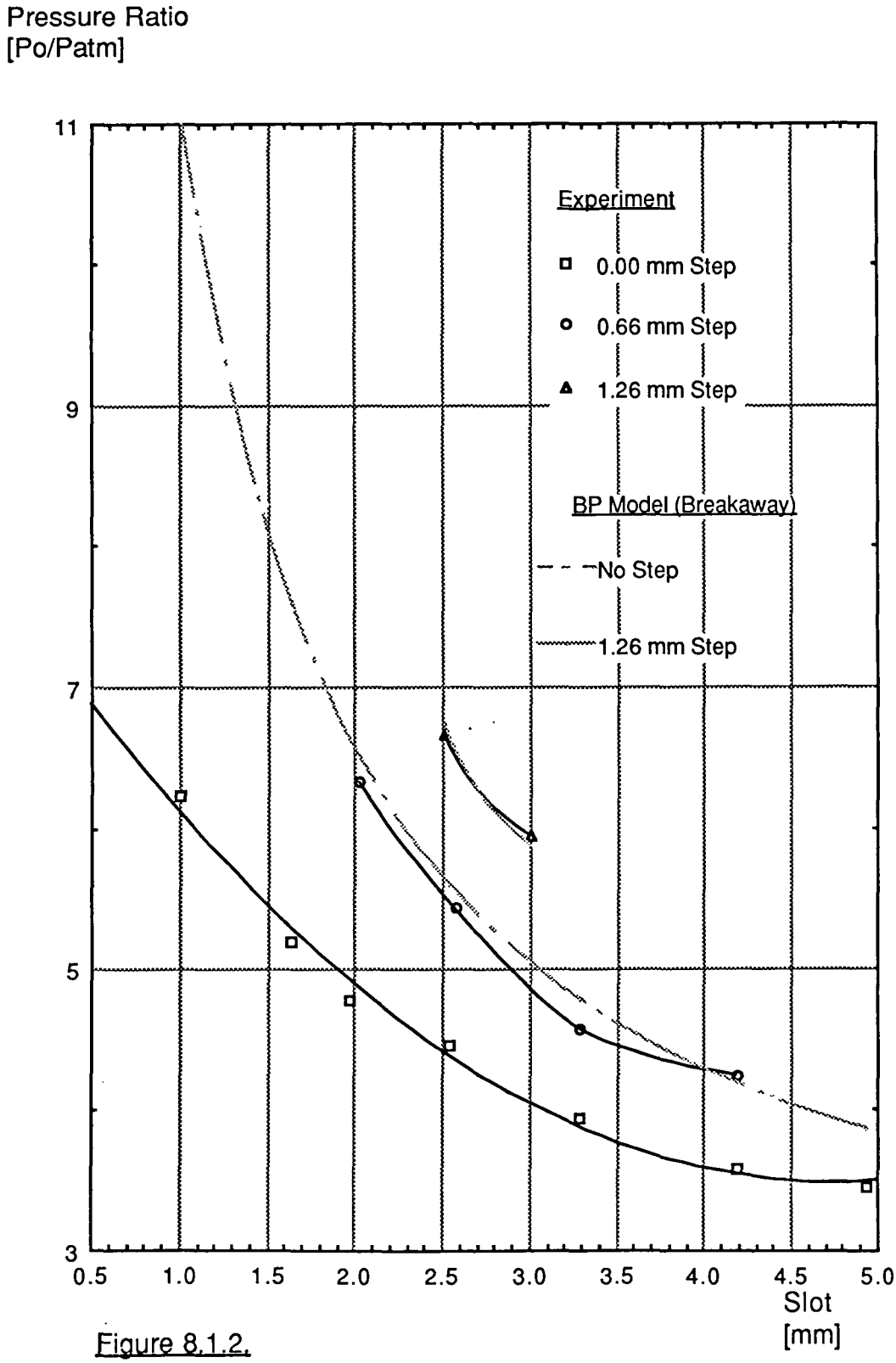

Figure 8.1.2.

Axisymmetric Coanda Model
Reversion Performance

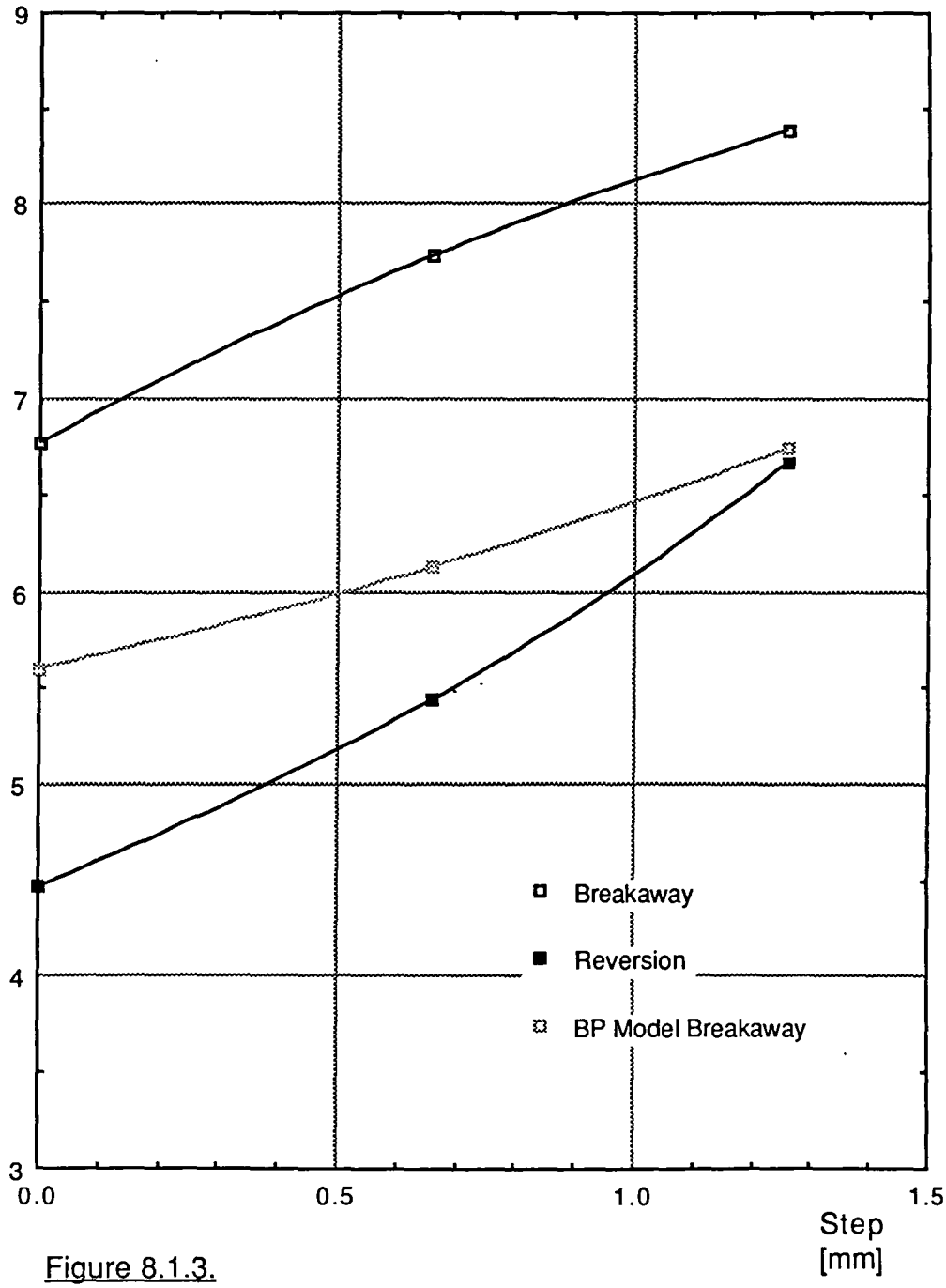

Figure 8.1.3.

Axisymmetric Coanda Model: 2.55mm Slot Breakaway/Reversion Behaviour

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Fig. 8.1.3 PLANAR COANDA MODEL PARTIAL REVERSION BEHAVIOUR.

Fig. 8.1.4

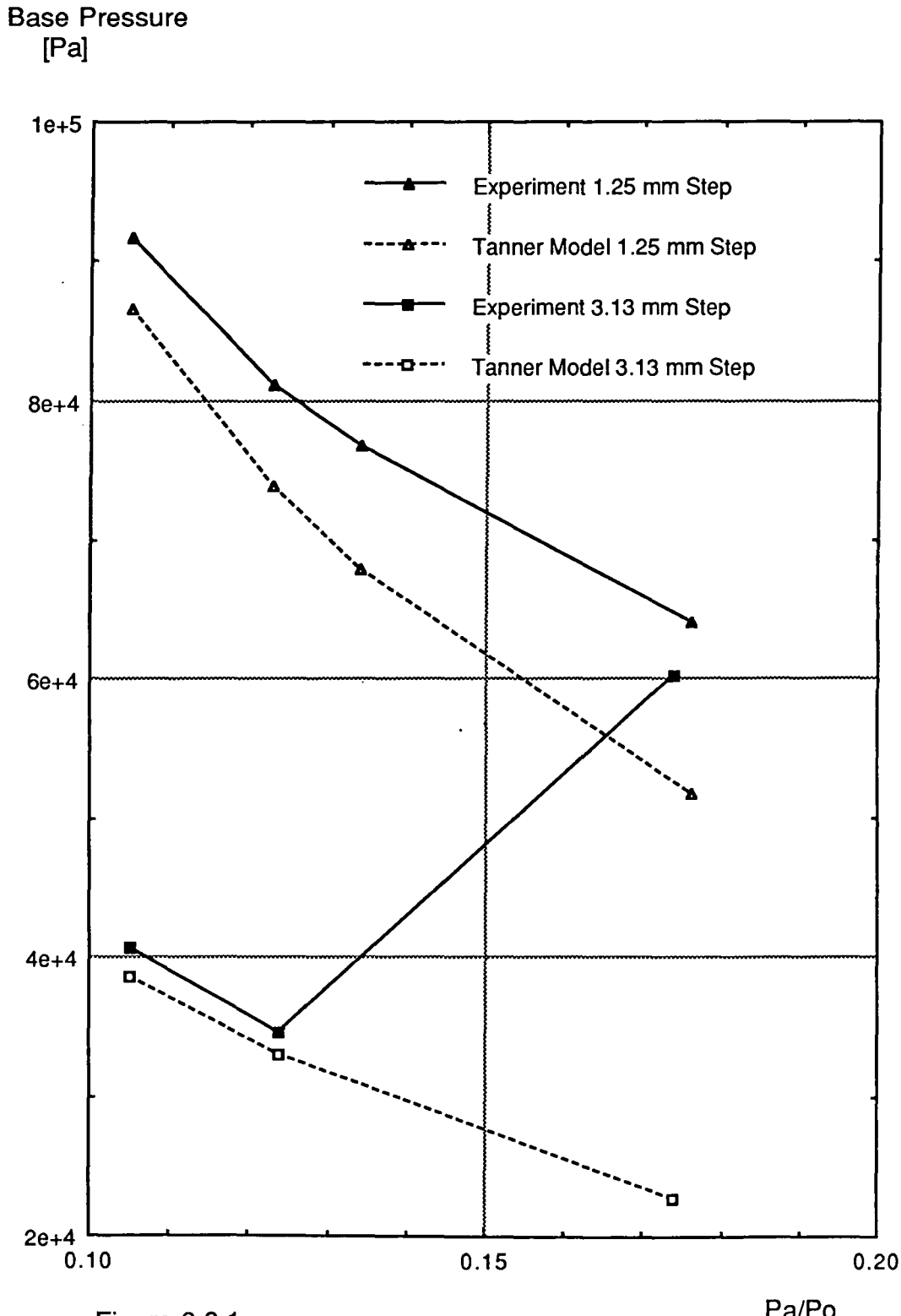


Figure 8.2.1.

Axisymmetric Coanda Model
Base Pressures: 1.67 mm Slot

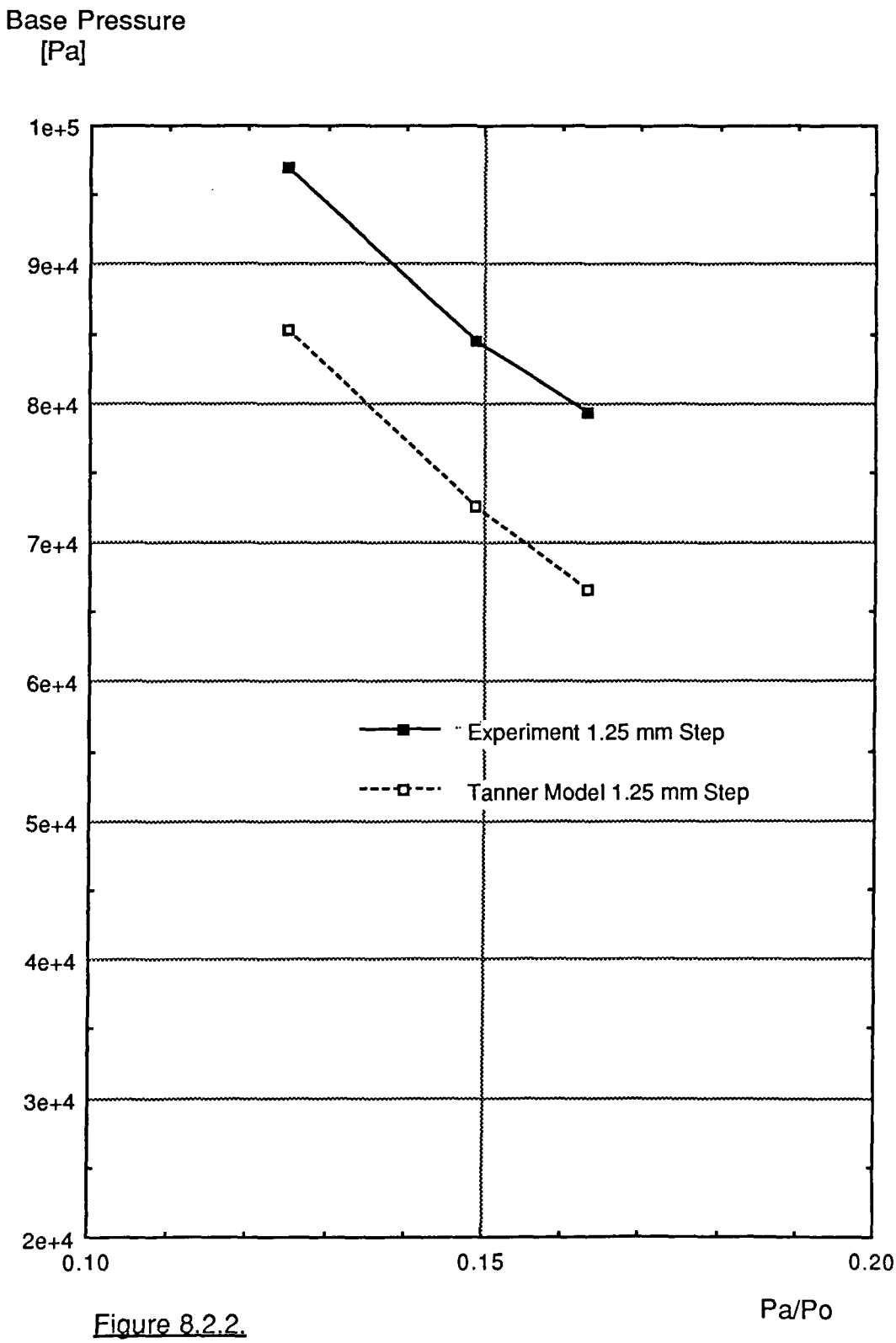


Figure 8.2.2.

Axisymmetric Coanda Model
Base Pressures: 2.55 mm Slot

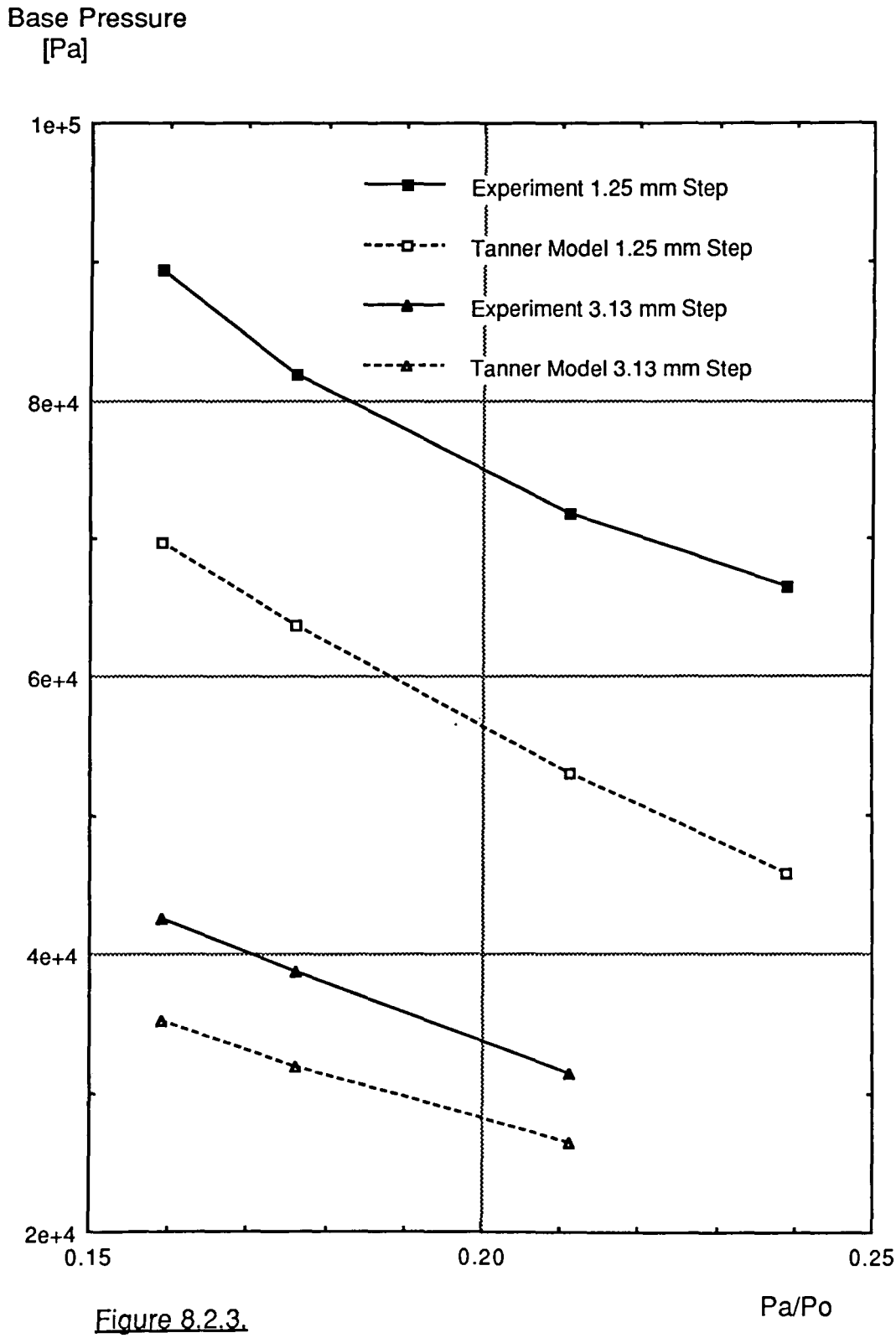


Figure 8.2.3.

Axisymmetric Coanda Model
Base Pressures: 3.33 mm Slot

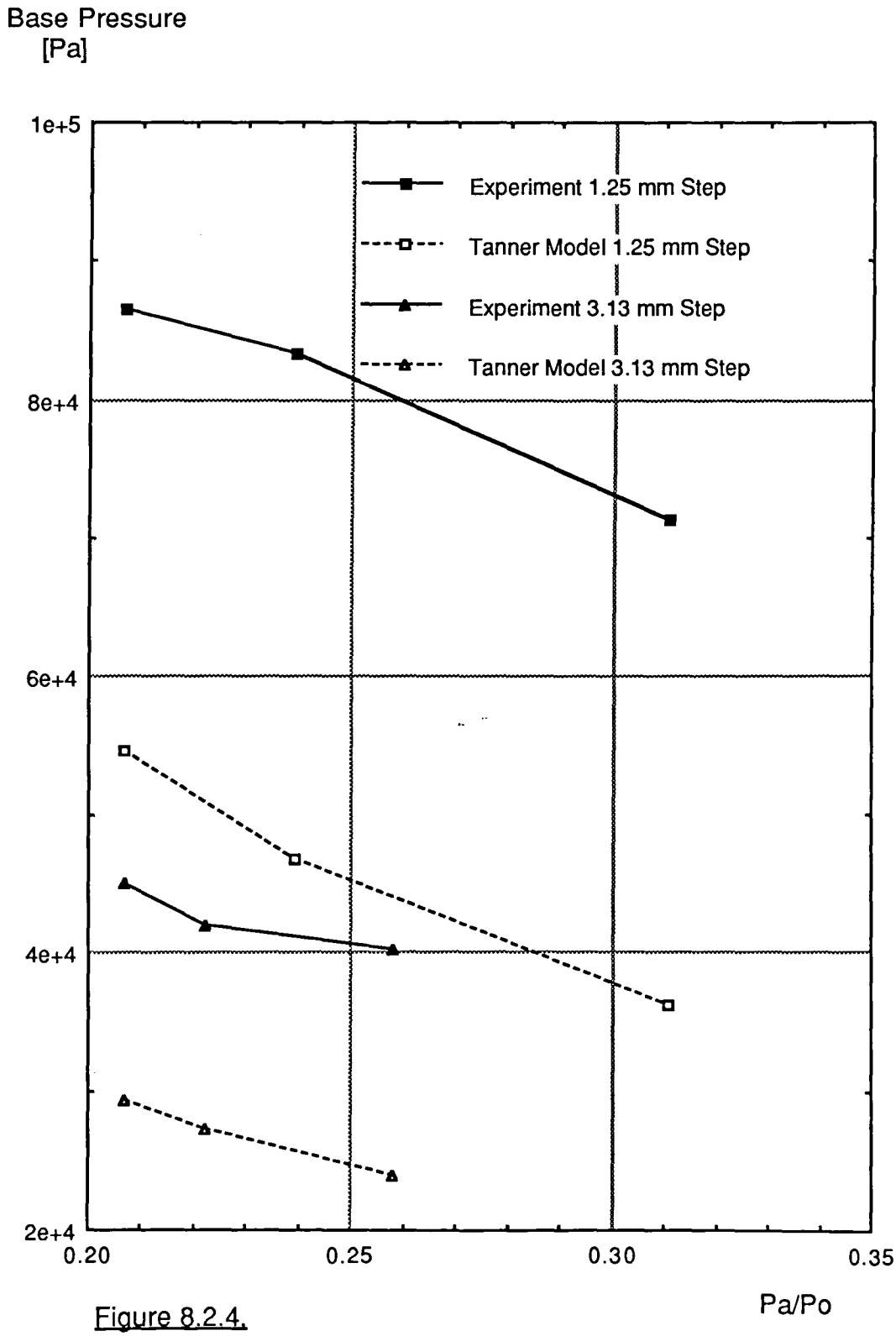


Figure 8.2.4.

Axisymmetric Coanda Model
Base Pressures: 5.00 mm Slot

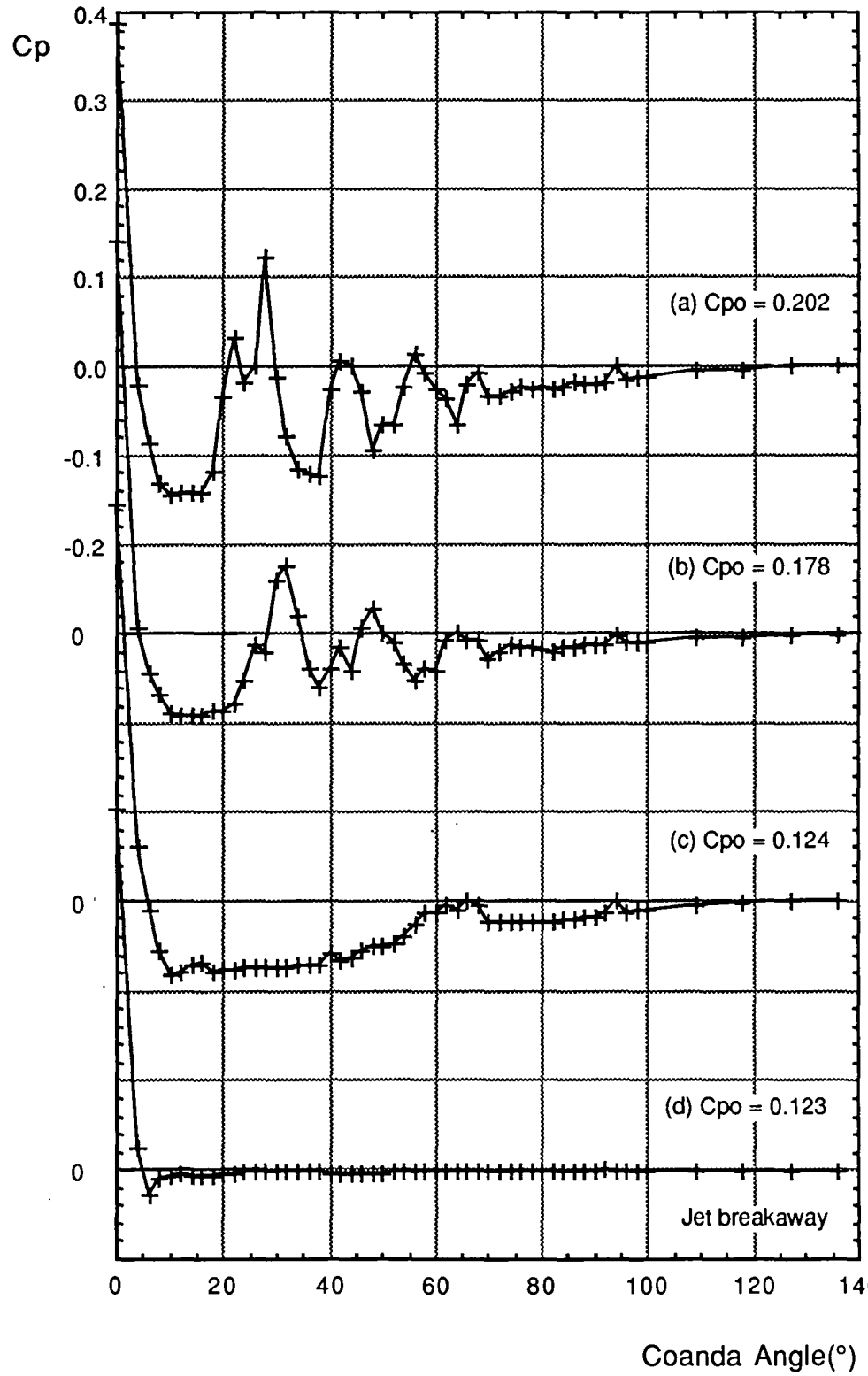


Figure 8.1.5.

Axisymmetric Coanda Model
Experimental Surface Pressures

Slot = 1.67 mm; Step = 0.00 mm

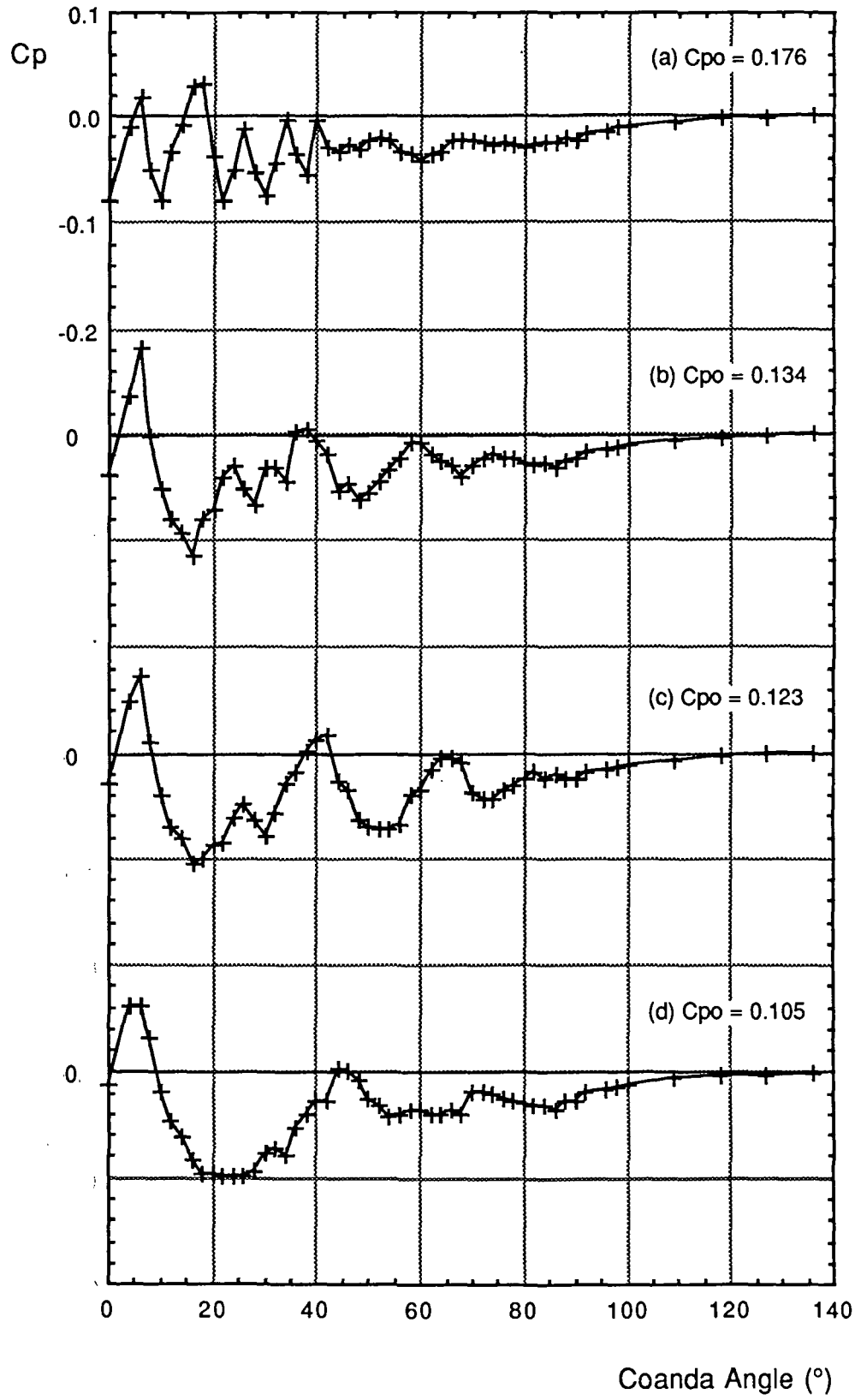


Figure 8.1.6.

Axisymmetric Coanda Model
Experimental Surface Pressures

Slot = 1.67 mm; Step = 1.25 mm

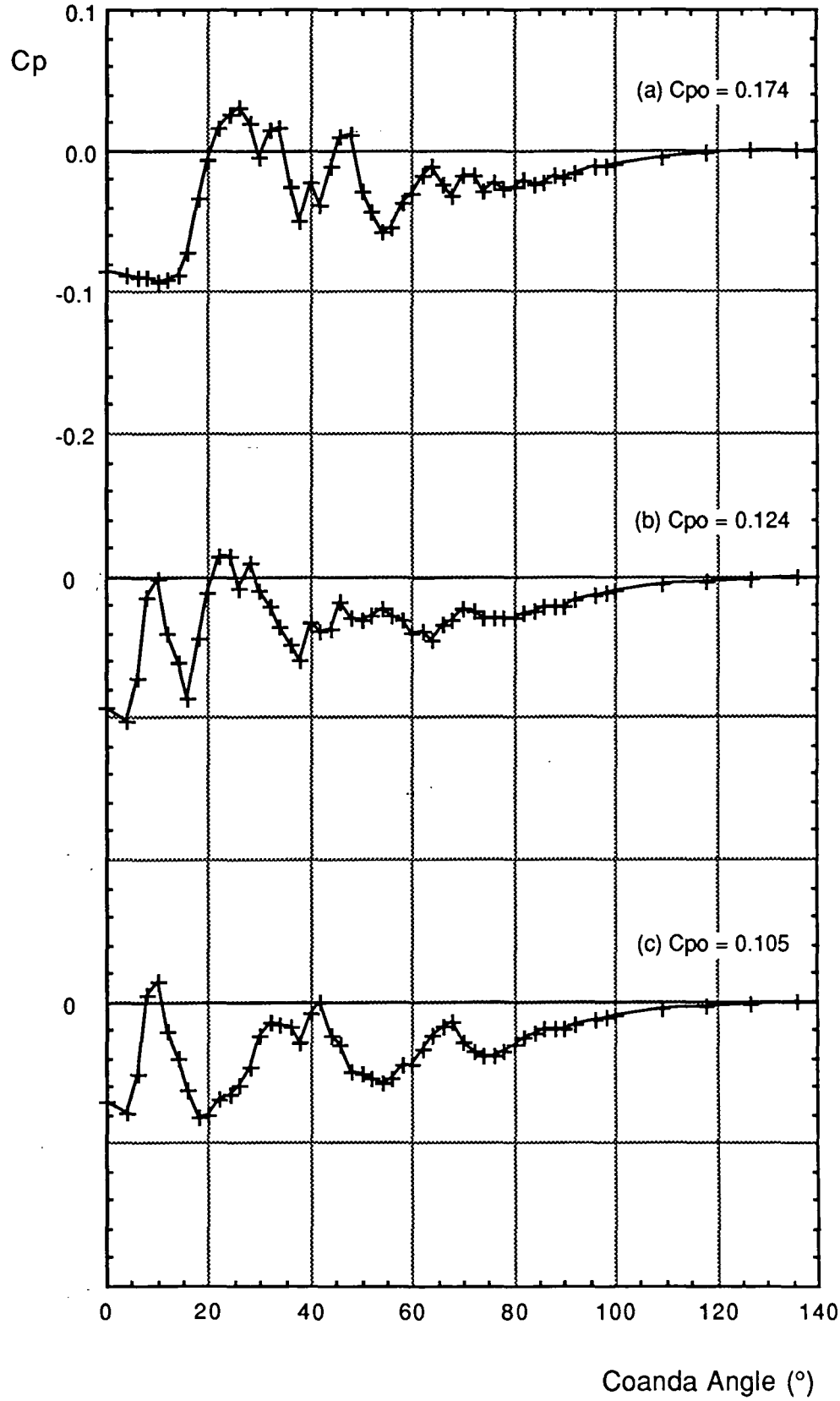


Figure 8.1.7.

Axisymmetric Coanda Model
Experimental Surface Pressures

Slot = 1.67 mm; Step = 3.13 mm

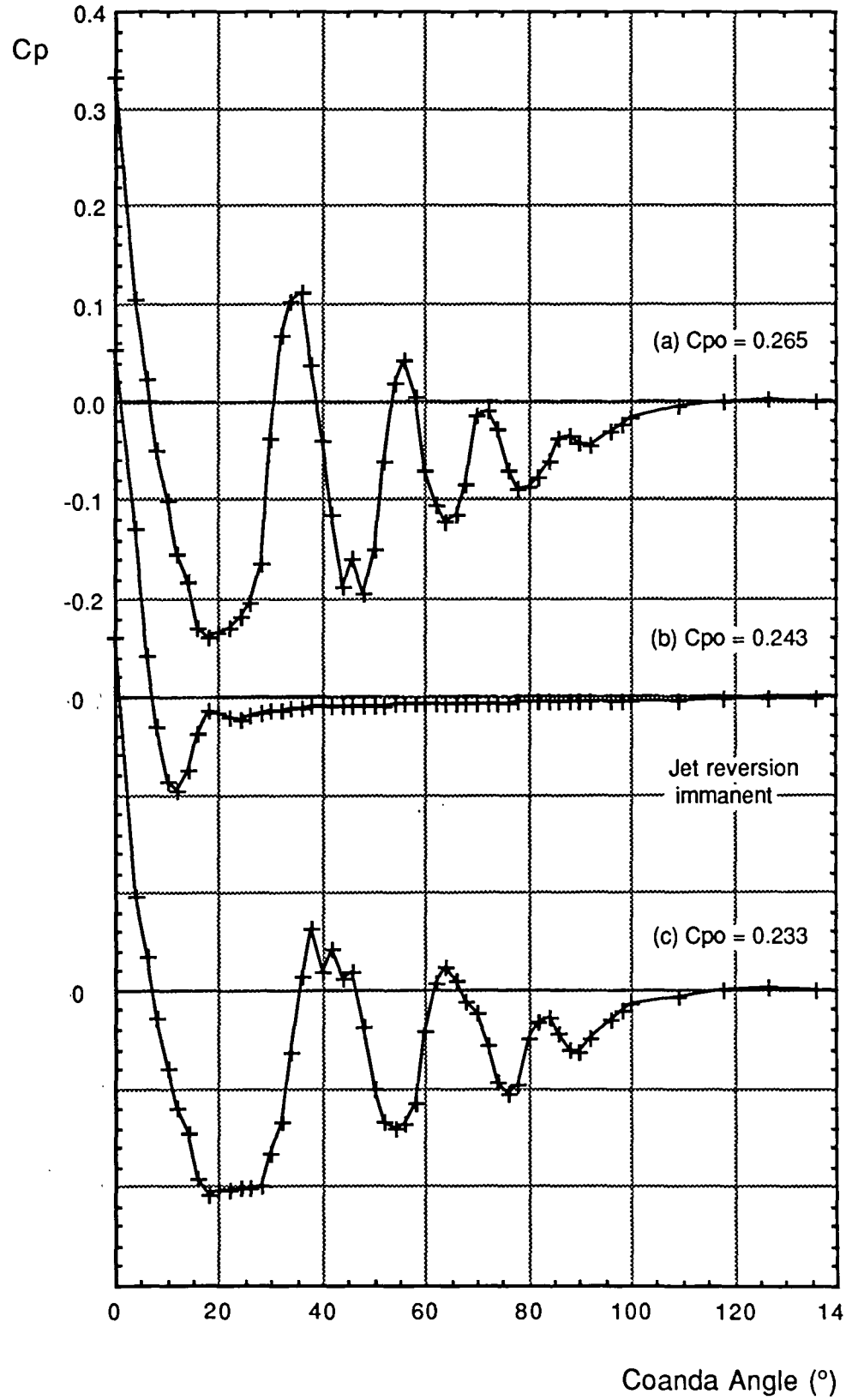


Figure 8.1.8.

Axisymmetric Coanda Model
Experimental Surface Pressures

Slot = 3.33 mm; Step = 0.00 mm

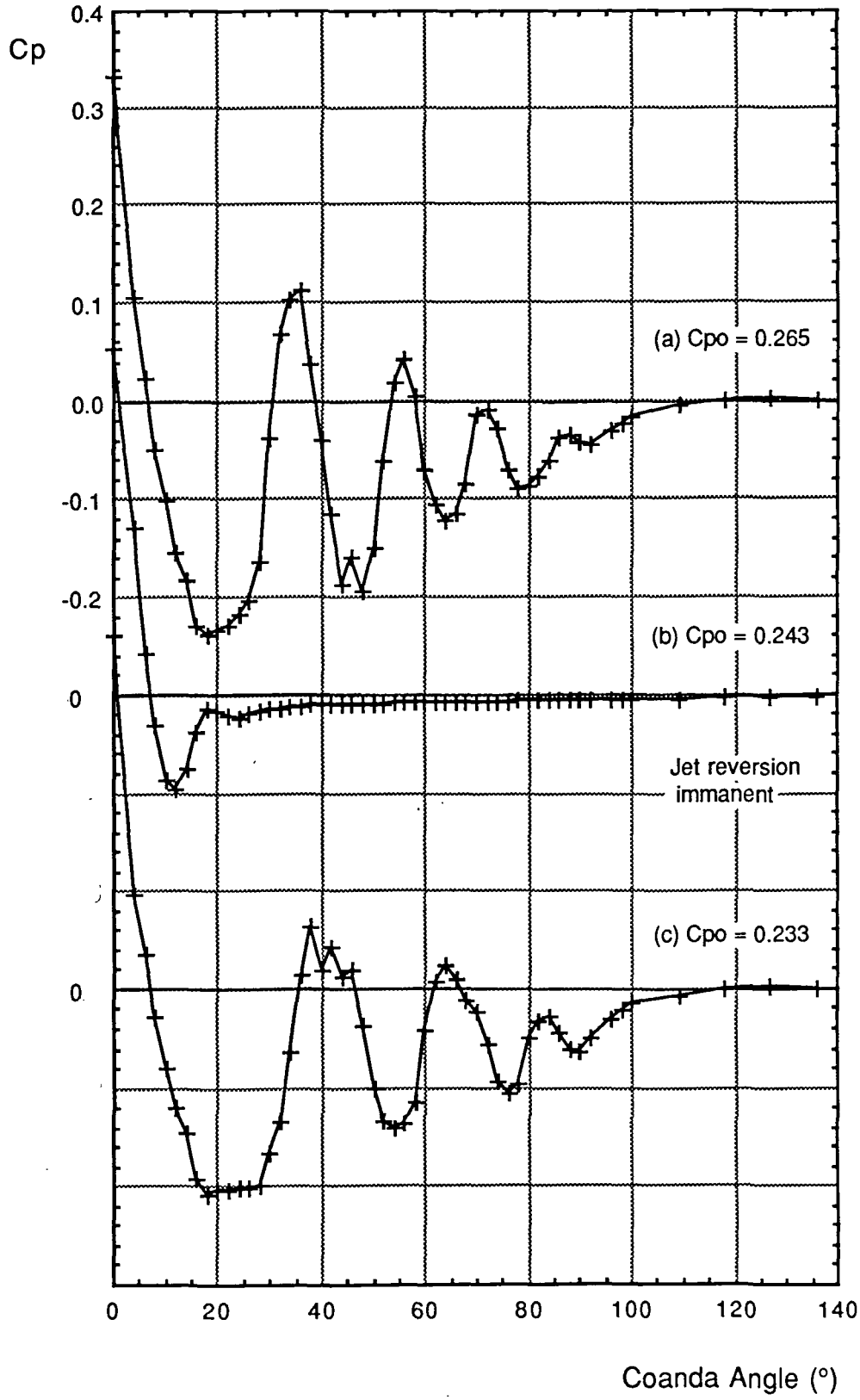


Figure 8.1.8.

Axisymmetric Coanda Model
Experimental Surface Pressures

Slot = 3.33 mm; Step = 0.00 mm

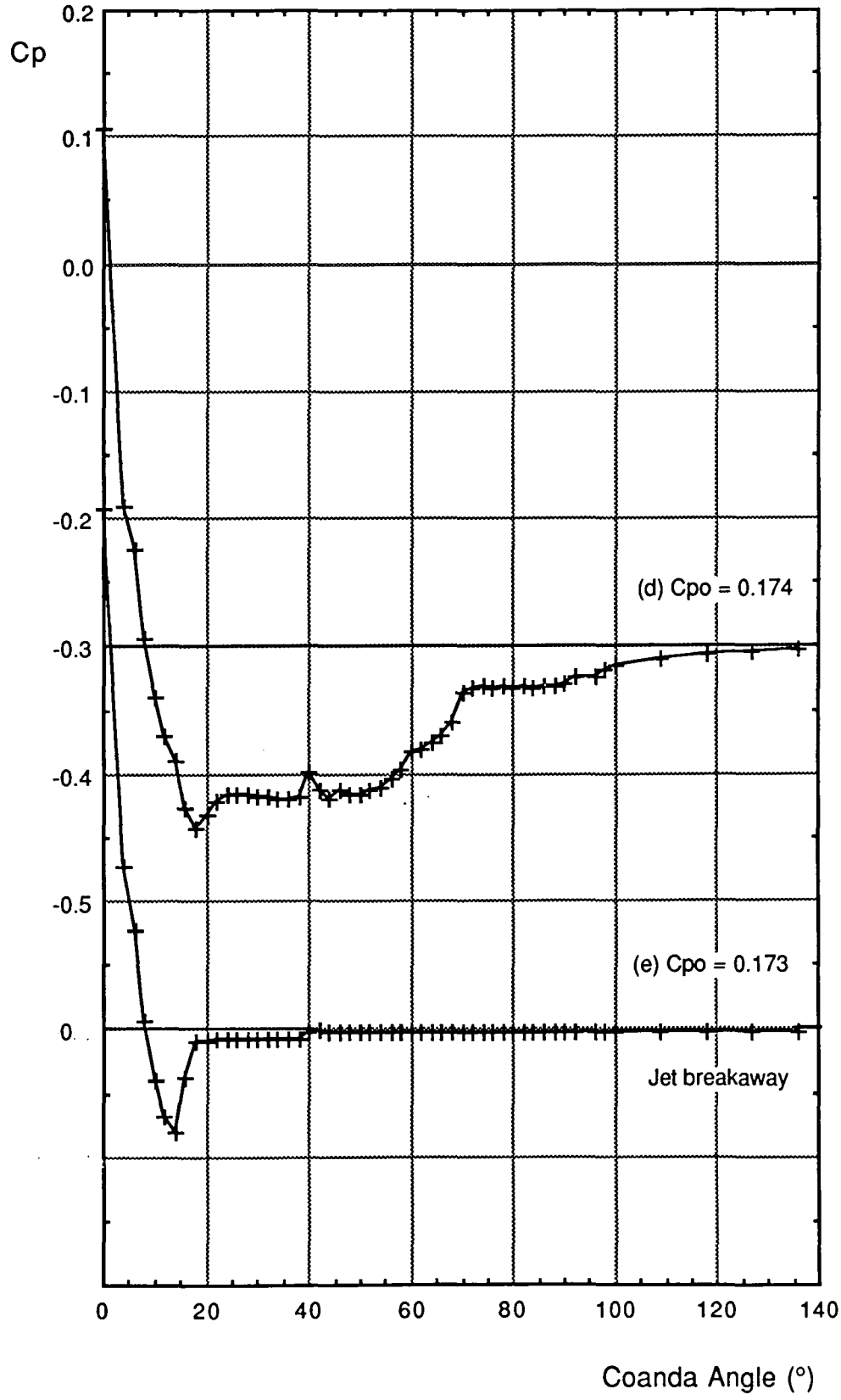


Figure 8.1.9.

Axisymmetric Coanda Model
Experimental Surface Pressures

Slot = 3.33 mm; Step = 0.00 mm

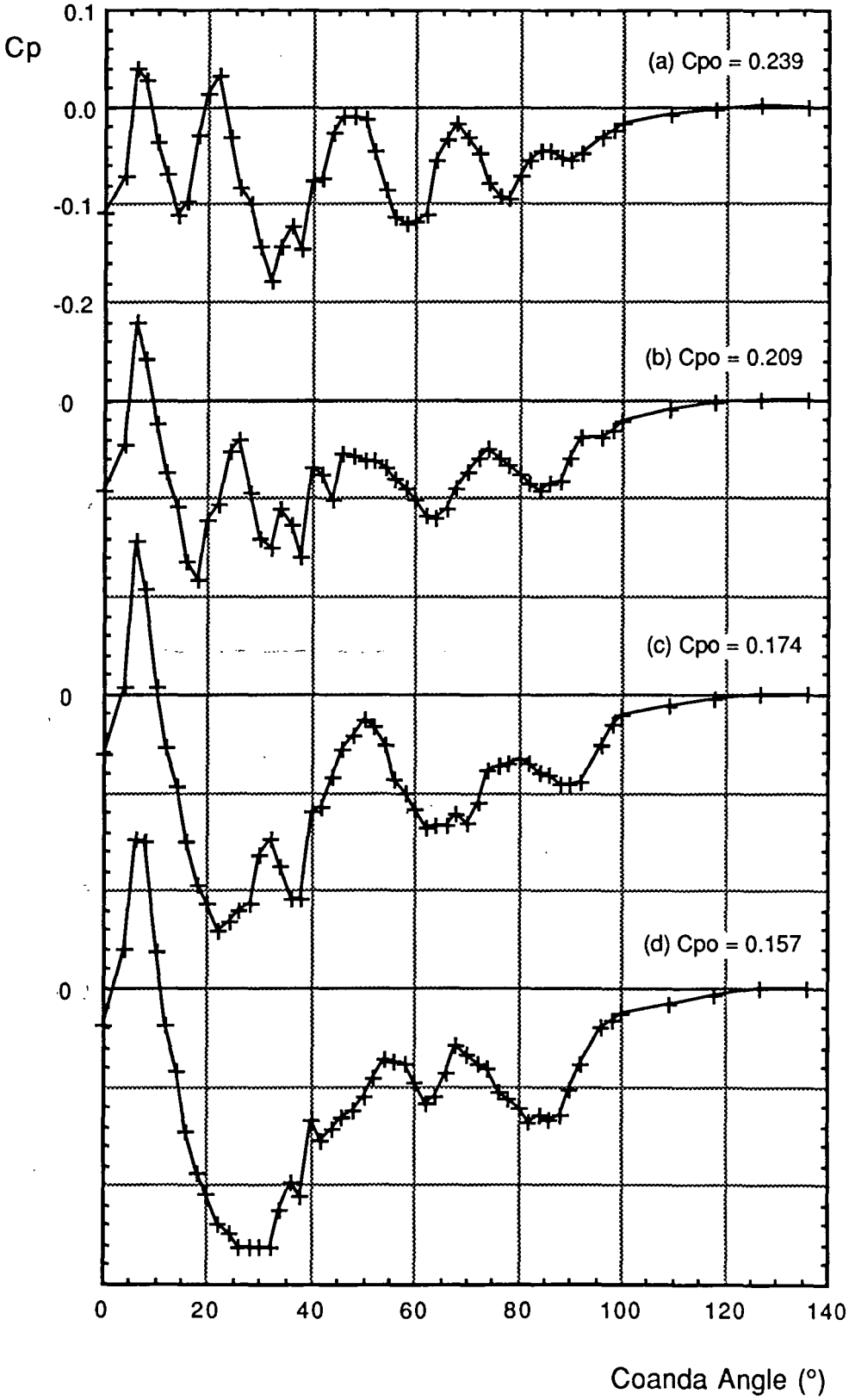


Figure 8.1.10.

Axisymmetric Coanda Model
Experimental Surface Pressures

Slot = 3.33 mm; Step = 1.25 mm

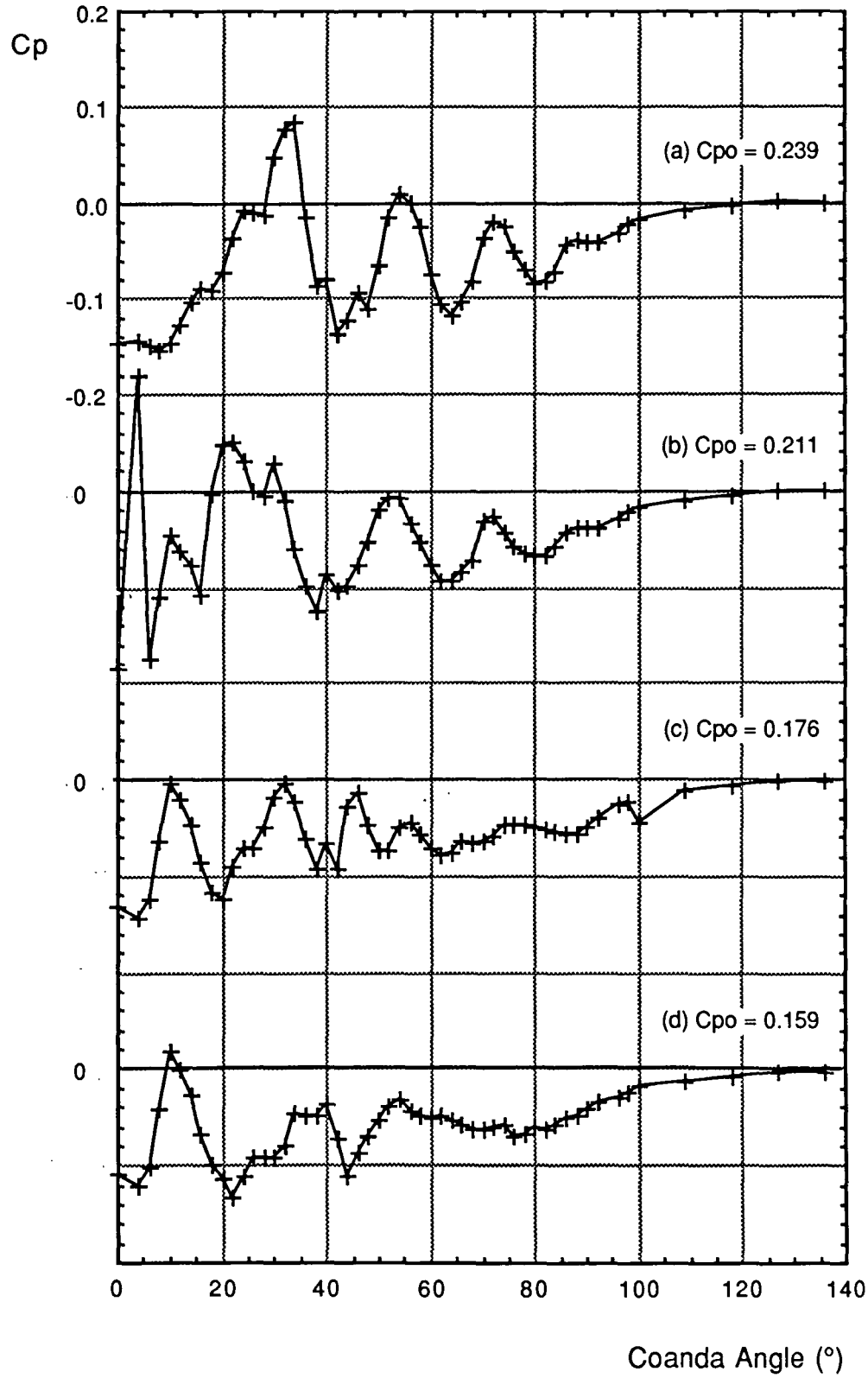


Figure 8.1.11.

Axisymmetric Coanda Model
Experimental Surface Pressures

Slot = 3.33 mm; Step = 3.13 mm

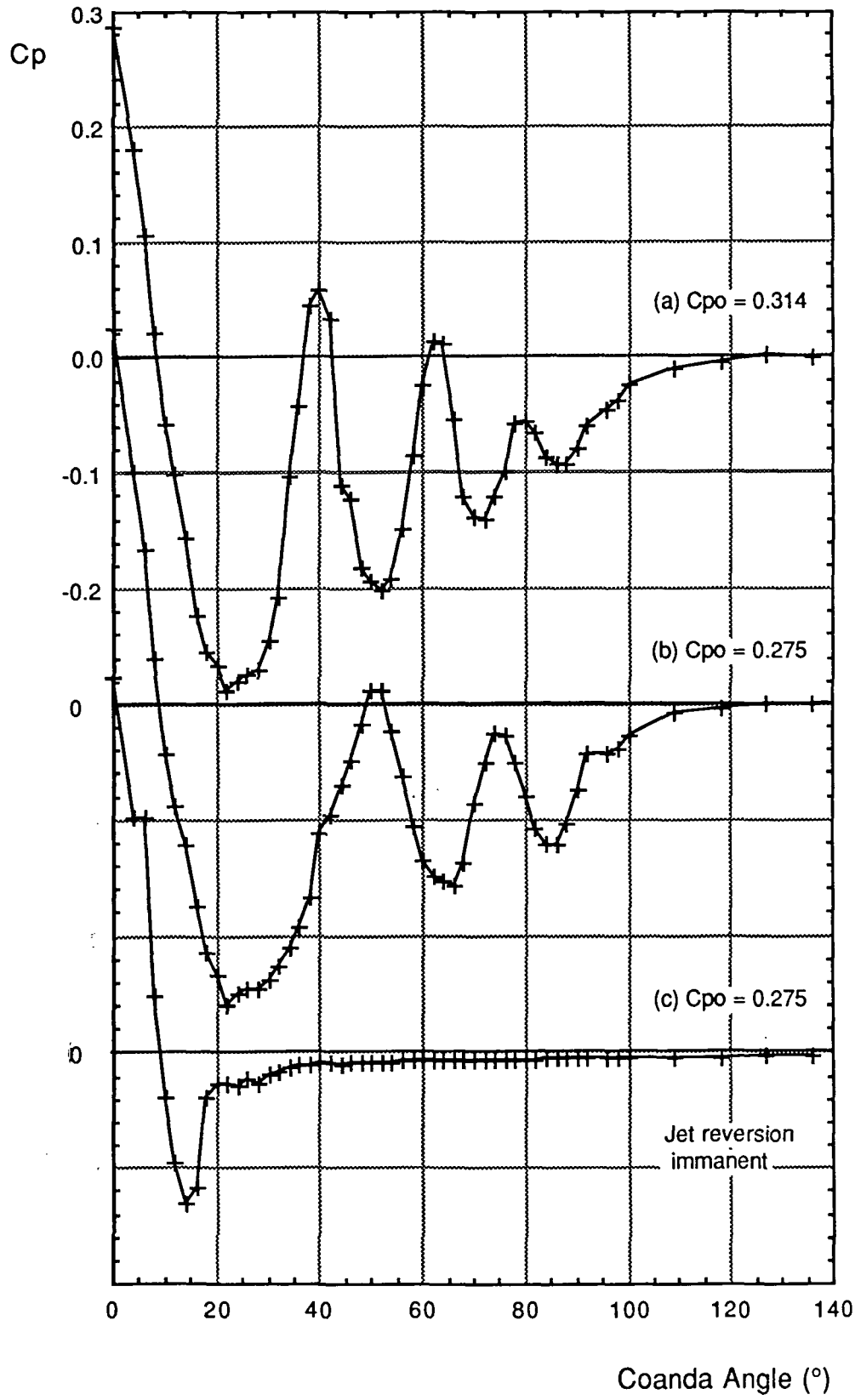


Figure 8.1.12.

Axisymmetric Coanda Model
Experimental Surface Pressures

Slot = 5.00 mm; Step = 0.00 mm

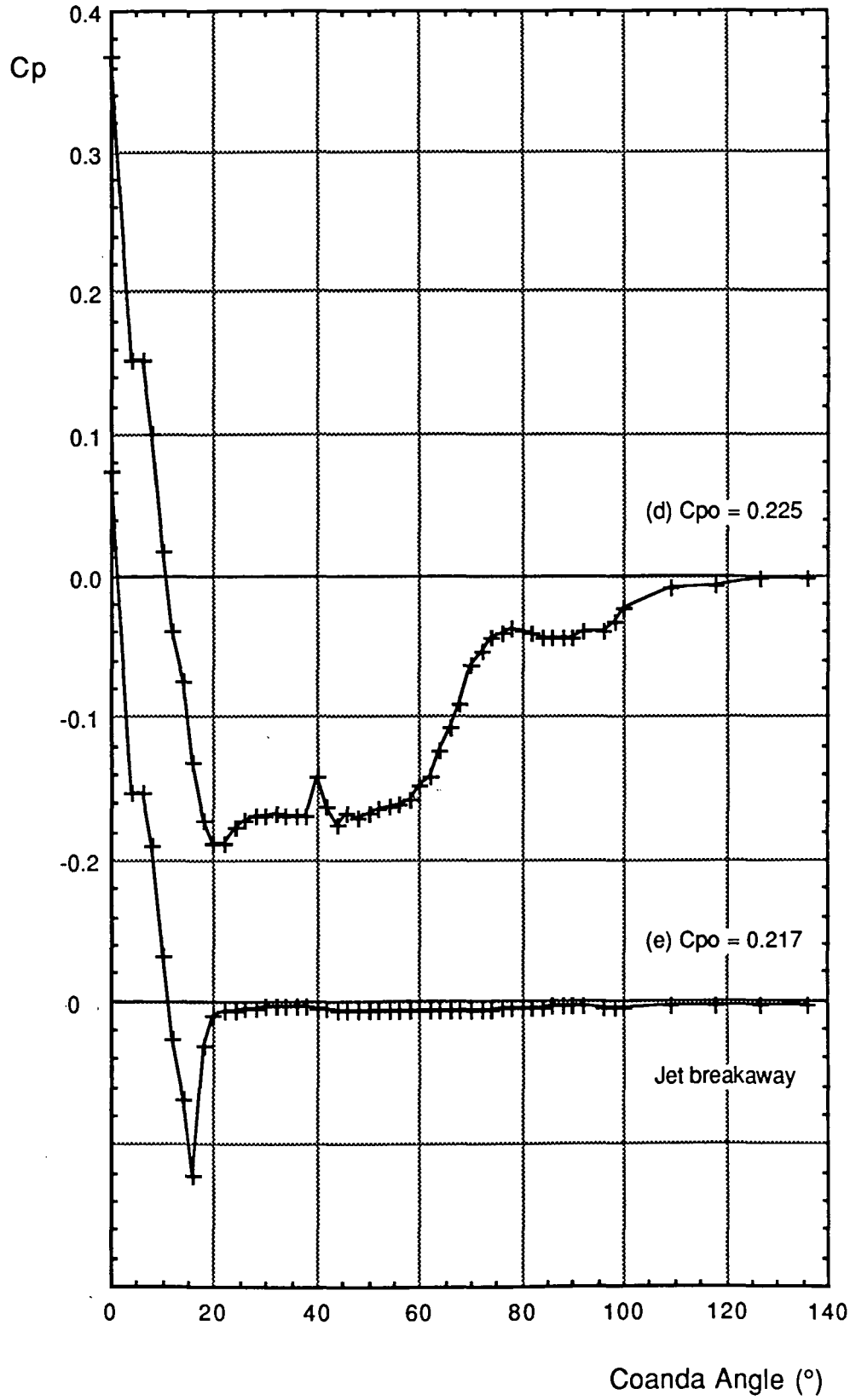


Figure 8.1.13.

Axisymmetric Coanda Model
Experimental Surface Pressures

Slot = 5.00 mm; Step = 0.00 mm

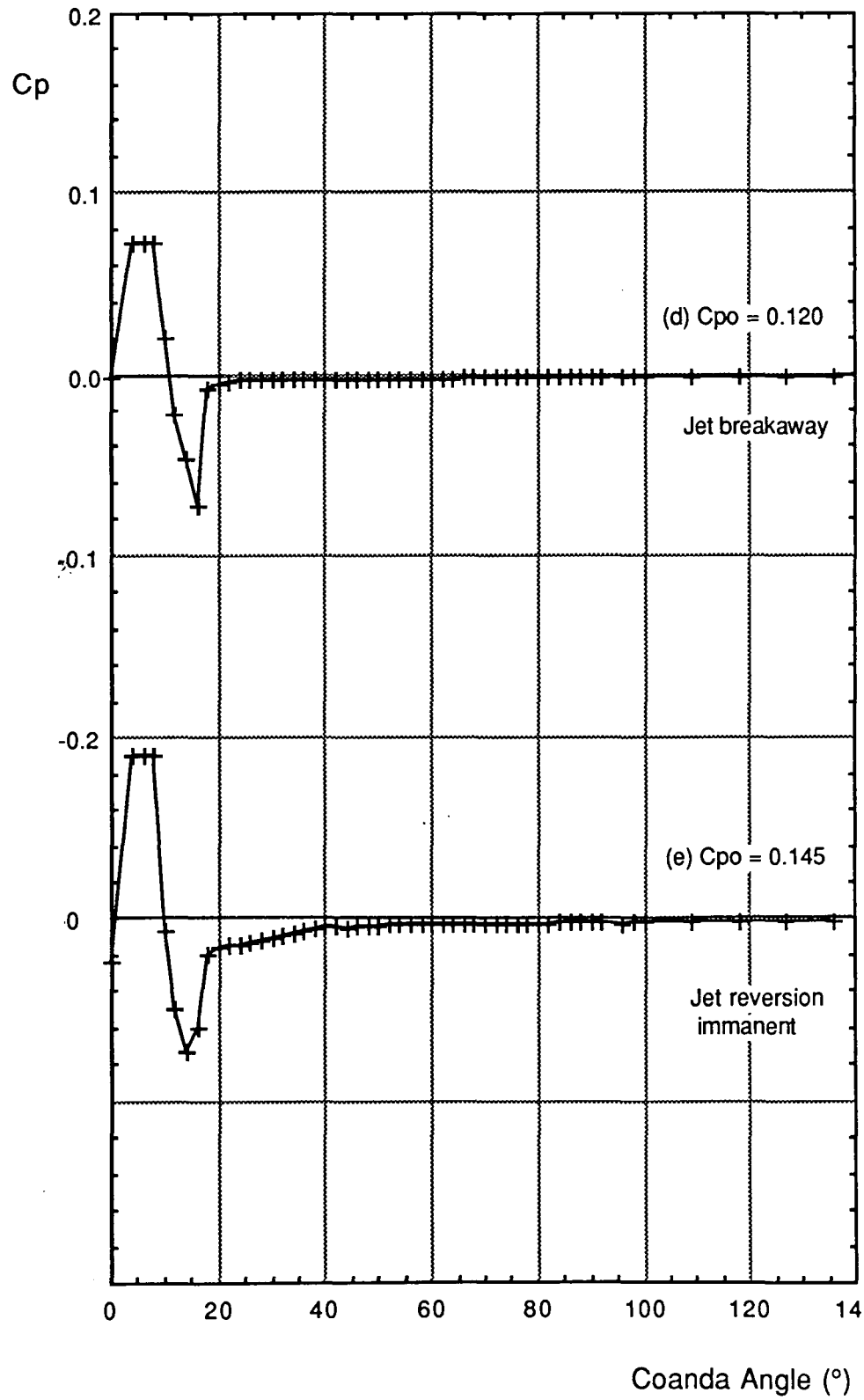


Figure 8.1.17.

Axisymmetric Coanda Model
Experimental Surface Pressures

Slot = 2.54 mm; Step = 1.25 mm

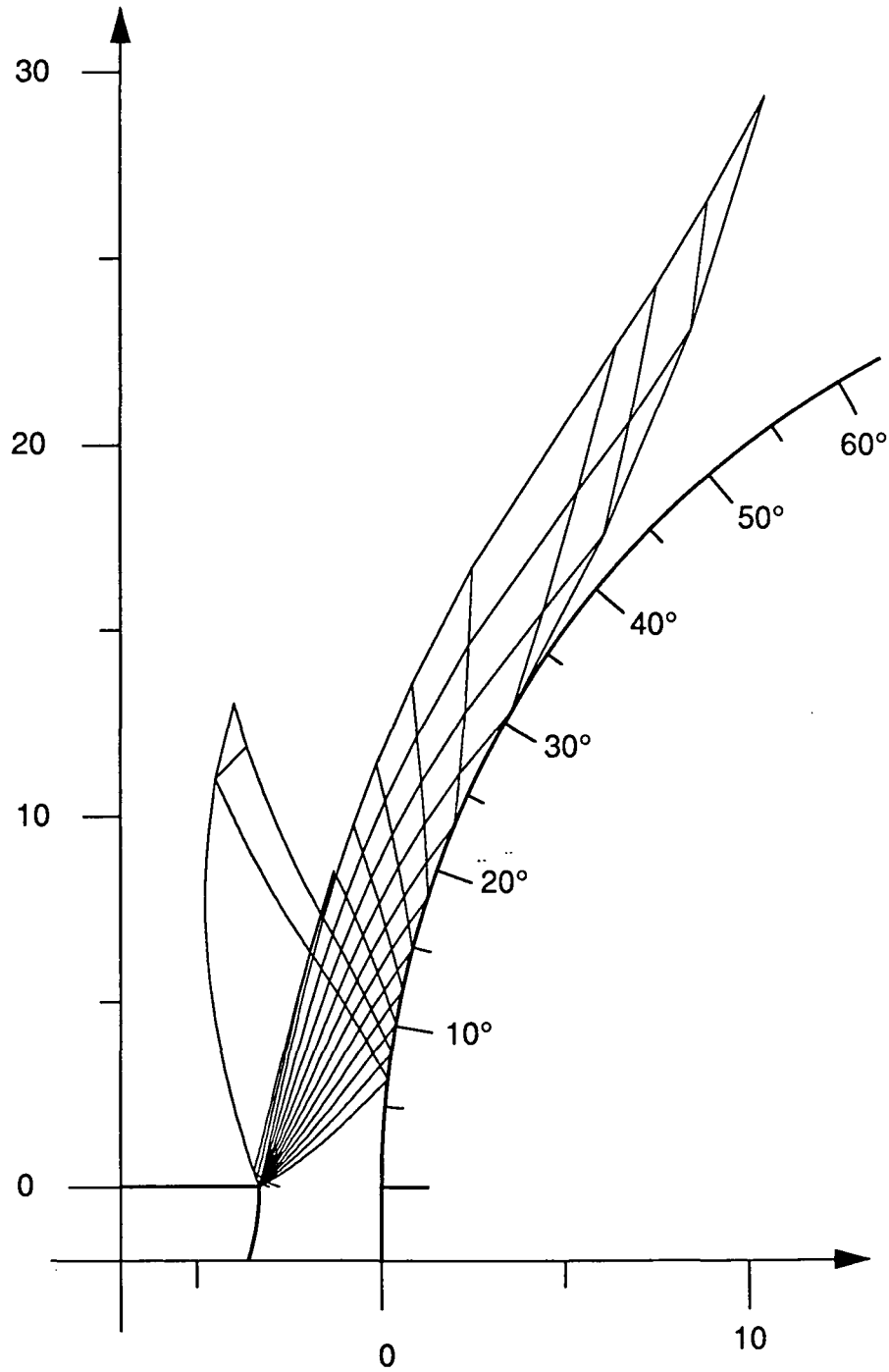


Figure 8.2.5. Axisymmetric Coanda Model
Method of Characteristics Plot
Shock Fitting
Slot = 3.33 mm Step = 0.00 mm
Patm/Po = 0.174

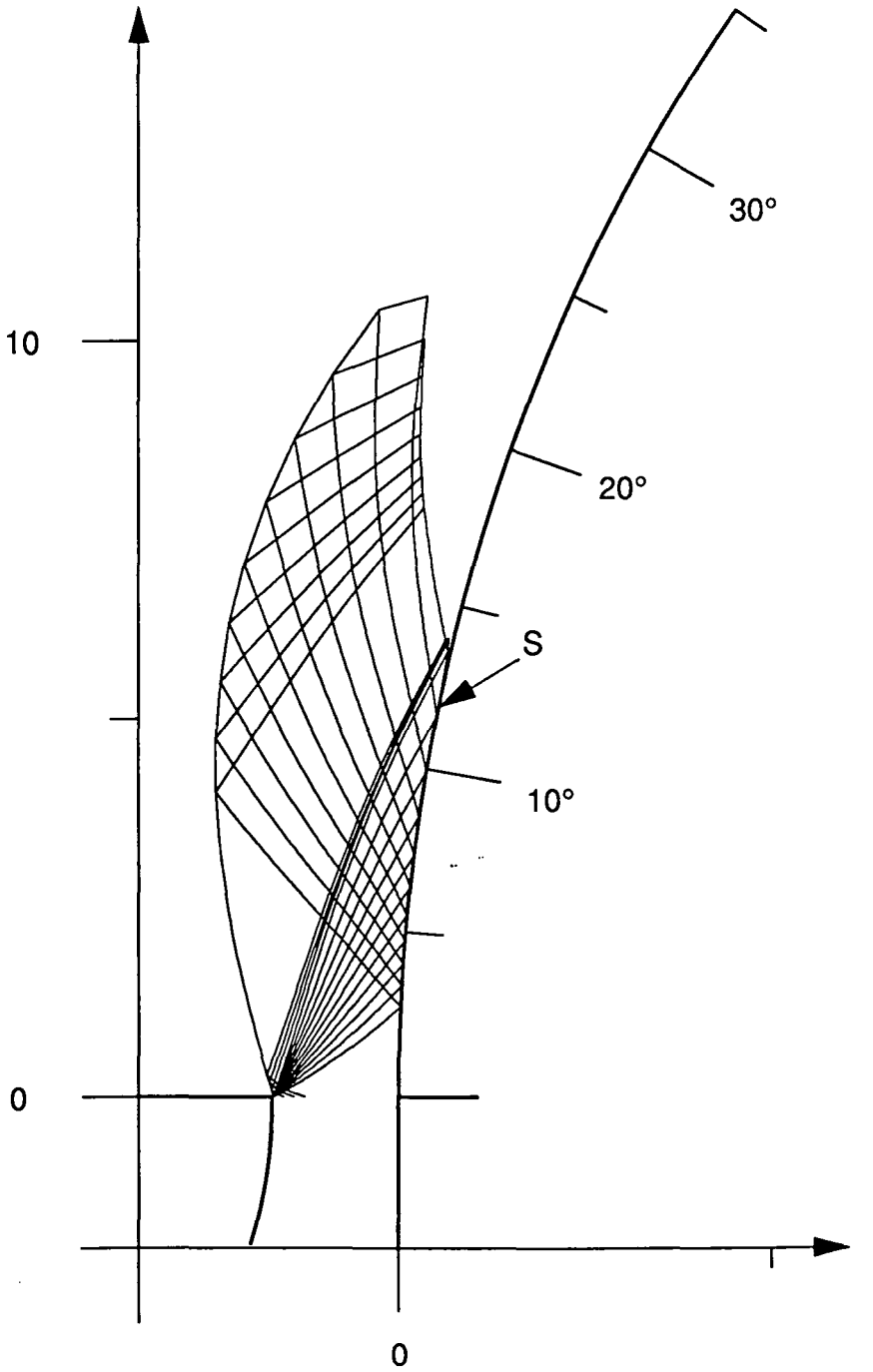


Figure 8.2.6. Axisymmetric Coanda Model
Method of Characteristics Plot
Shock Fitting; Separation Model
Slot = 1.67 mm Step = 0.00 mm
Patm/Po = 0.202

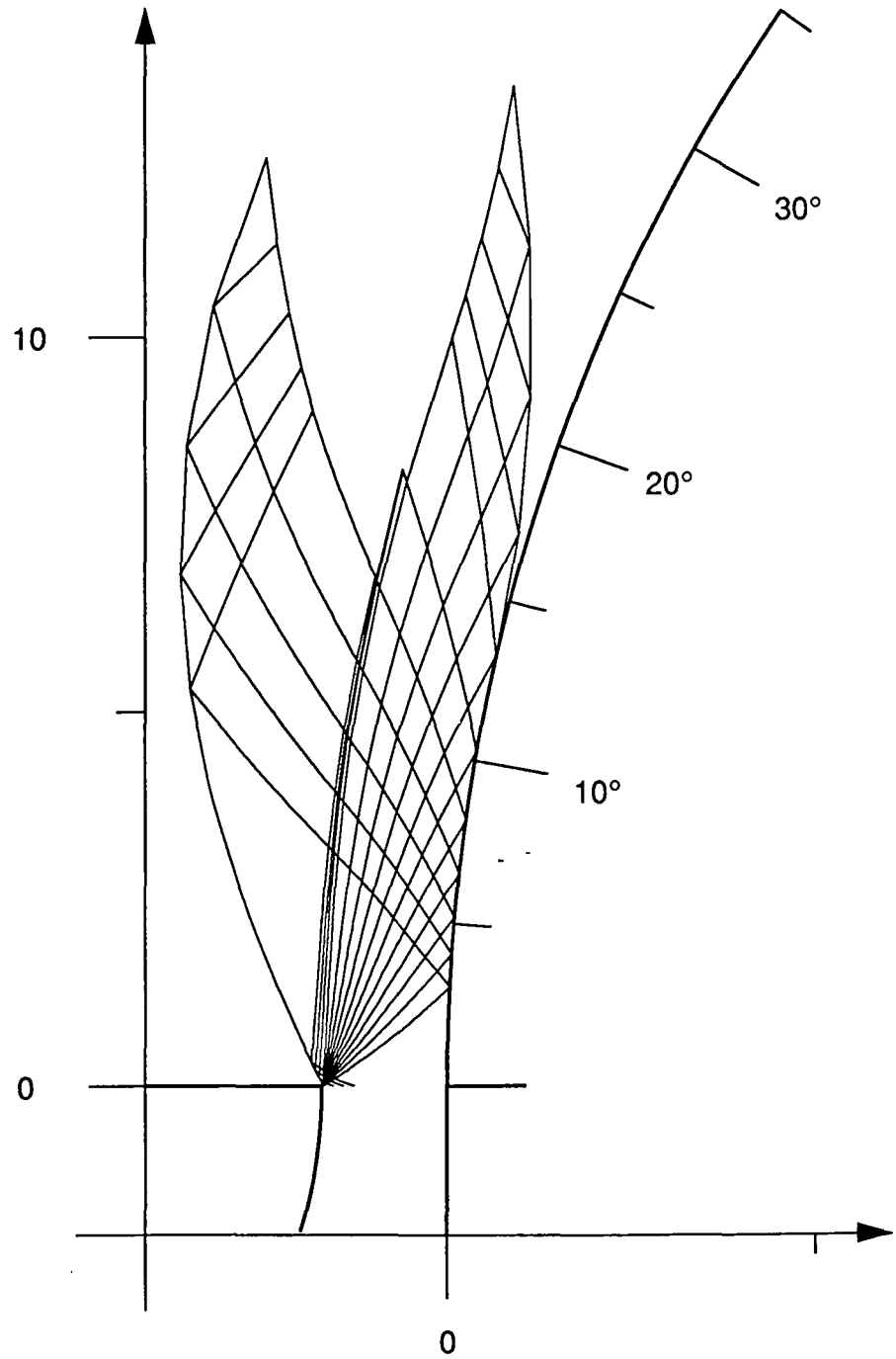


Figure 8.2.7. Axisymmetric Coanda Model
Method of Characteristics Plot
Shock Fitting; Separation Model
Slot = 1.67 mm Step = 0.00 mm
Patm/Po = 0.124

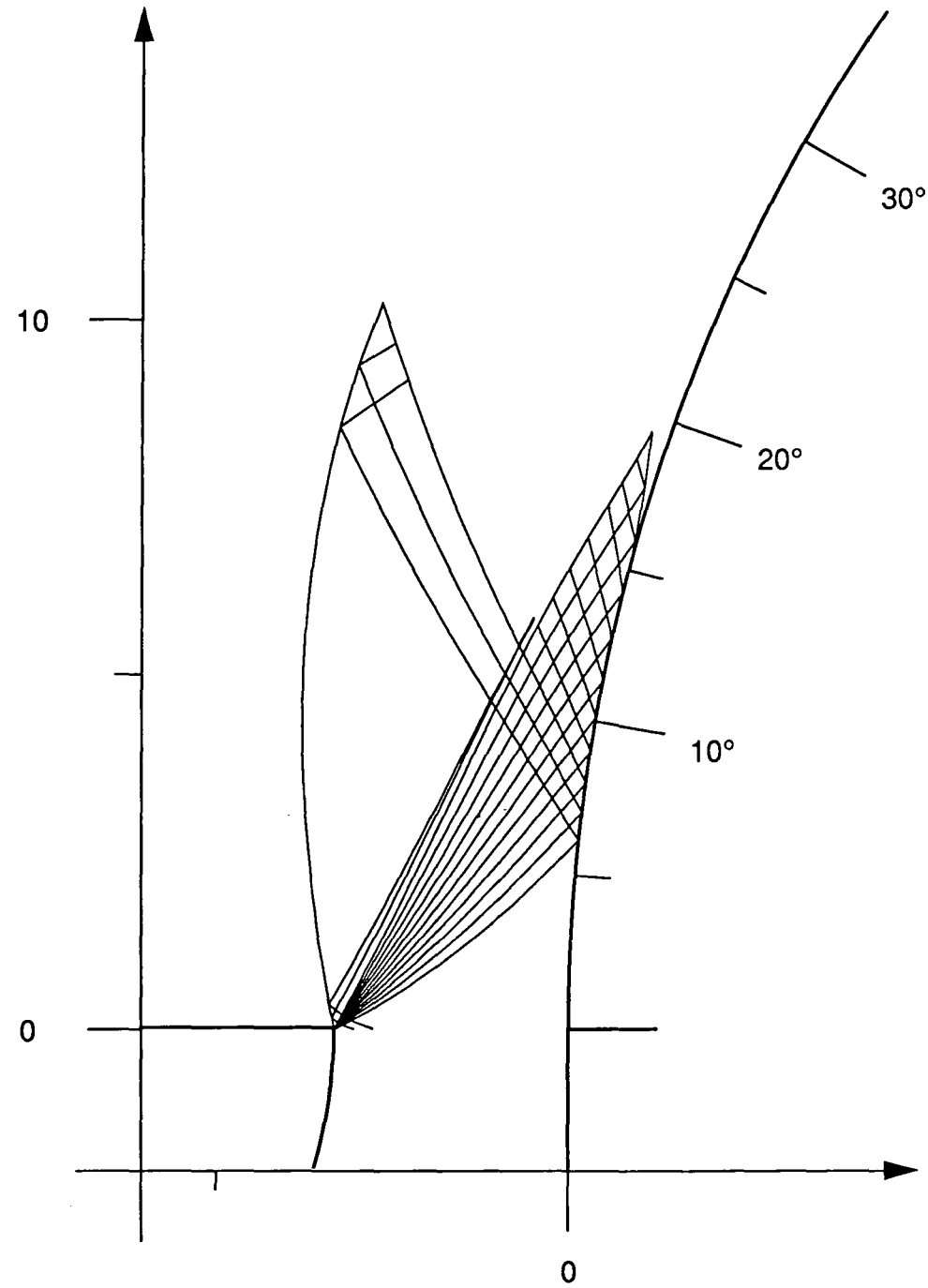


Figure 8.2.8. Axisymmetric Coanda Model
Method of Characteristics Plot

Shock Fitting; Separation Model
Slot = 3.33 mm Step = 0.00 mm
Patm/Po = 0.265

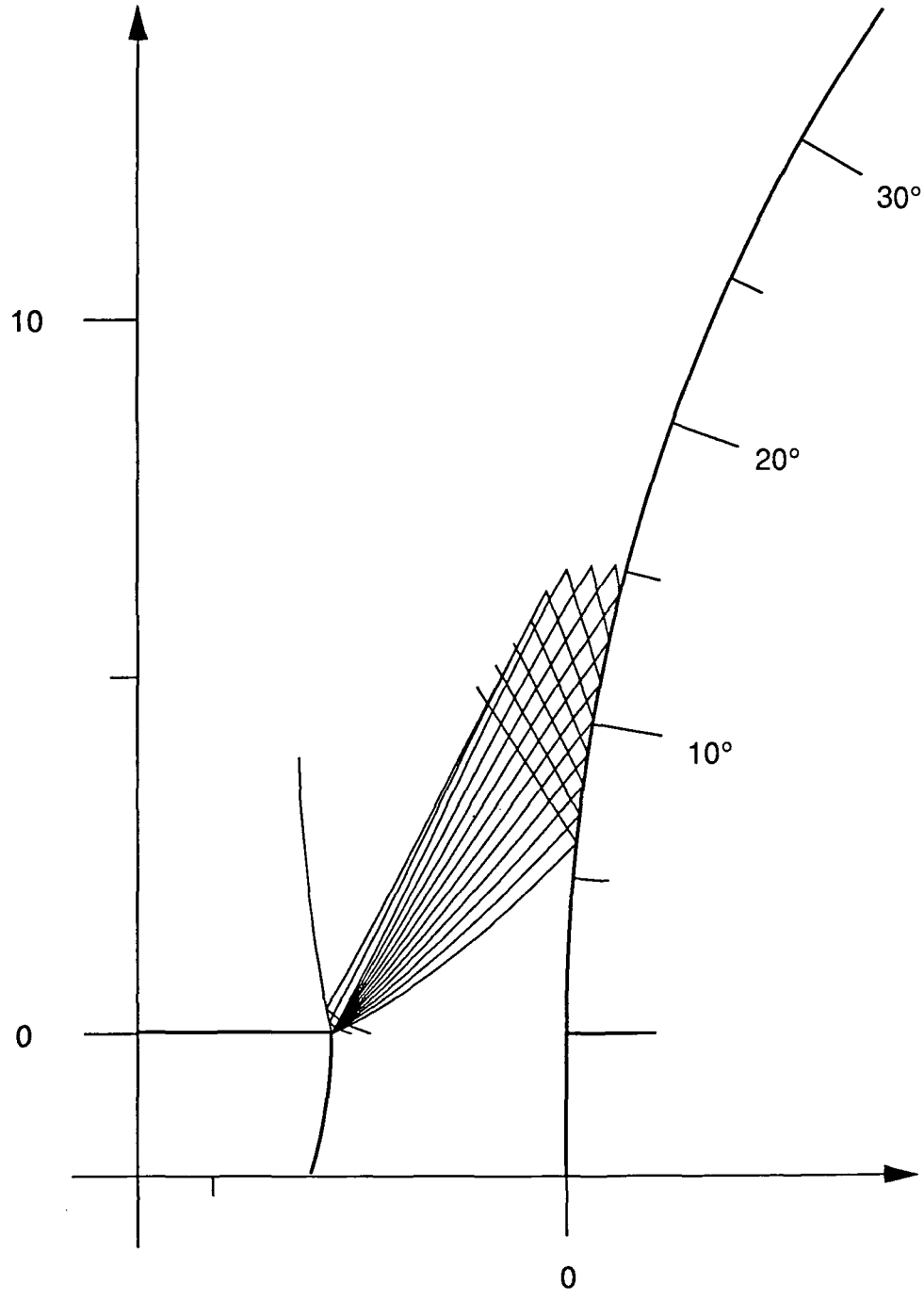


Figure 8.2.9. Axisymmetric Coanda Model
Method of Characteristics Plot
Separation Model
Slot = 3.33 mm Step = 0.00 mm
Patm/Po = 0.265

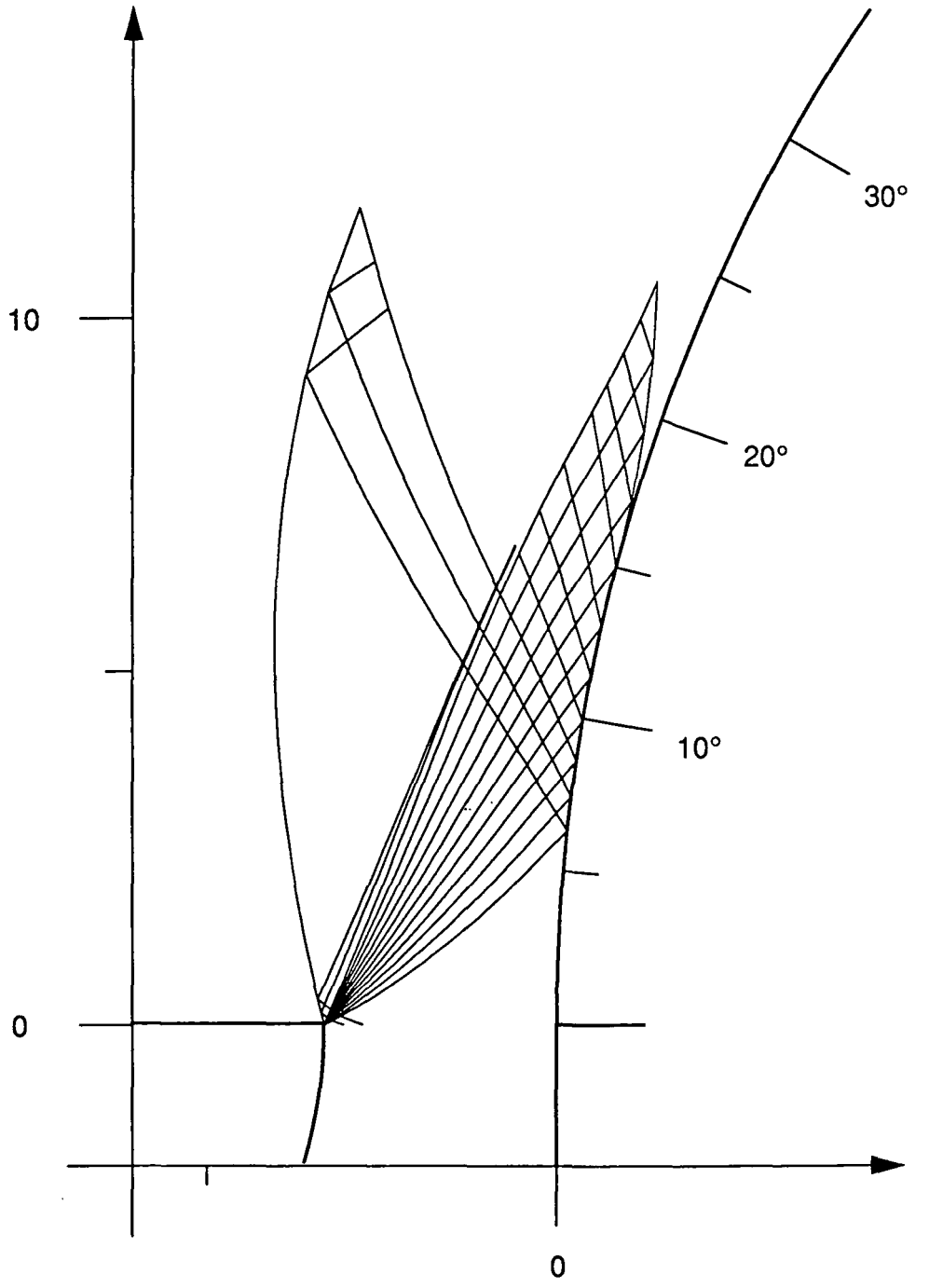


Figure 8.2.10. Axisymmetric Coanda Model
Method of Characteristics Plot
Shock Fitting; Separation Model
Slot = 3.33 mm Step = 0.00 mm
Patm/Po = 0.233

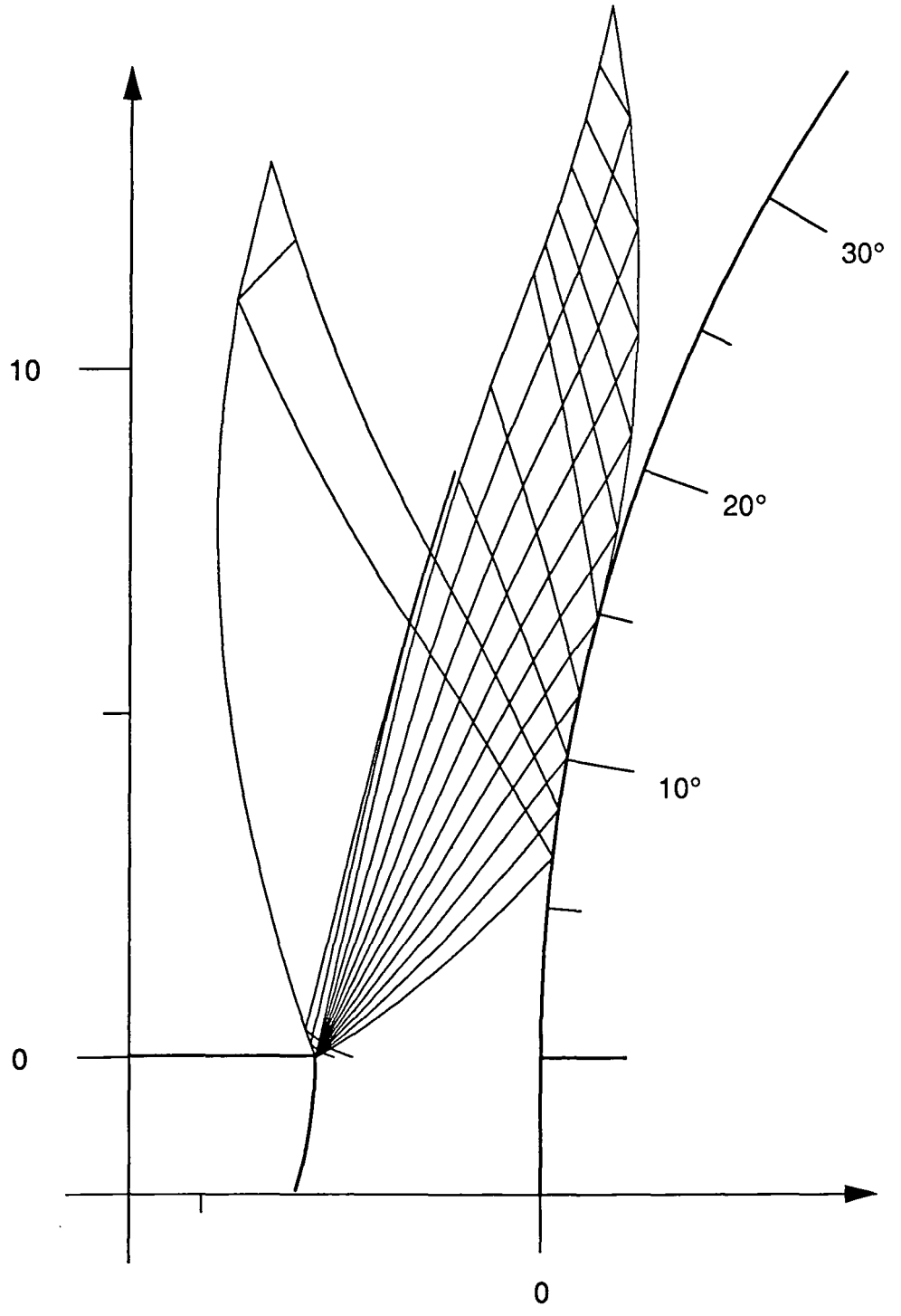


Figure 8.2.11. Axisymmetric Coanda Model
Method of Characteristics Plot
Shock Fitting; Separation Model
Slot = 3.33 mm Step = 0.00 mm
Patm/Po = 0.174

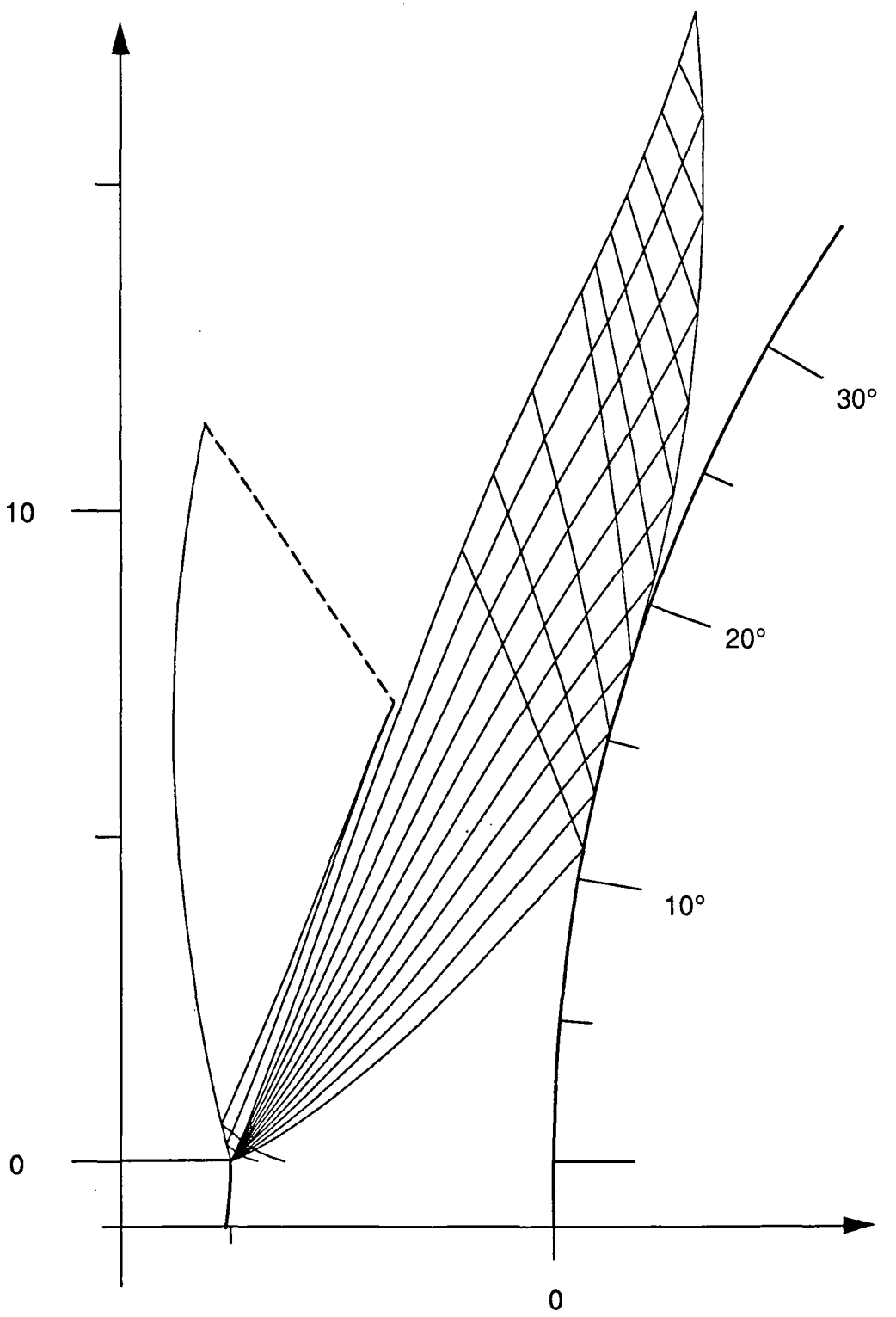


Figure 8.2.12. Axisymmetric Coanda Model
Method of Characteristics Plot

Shock Fitting; Separation Model
Slot = 5.00 mm Step = 0.00 mm
Patm/Po = 0.225

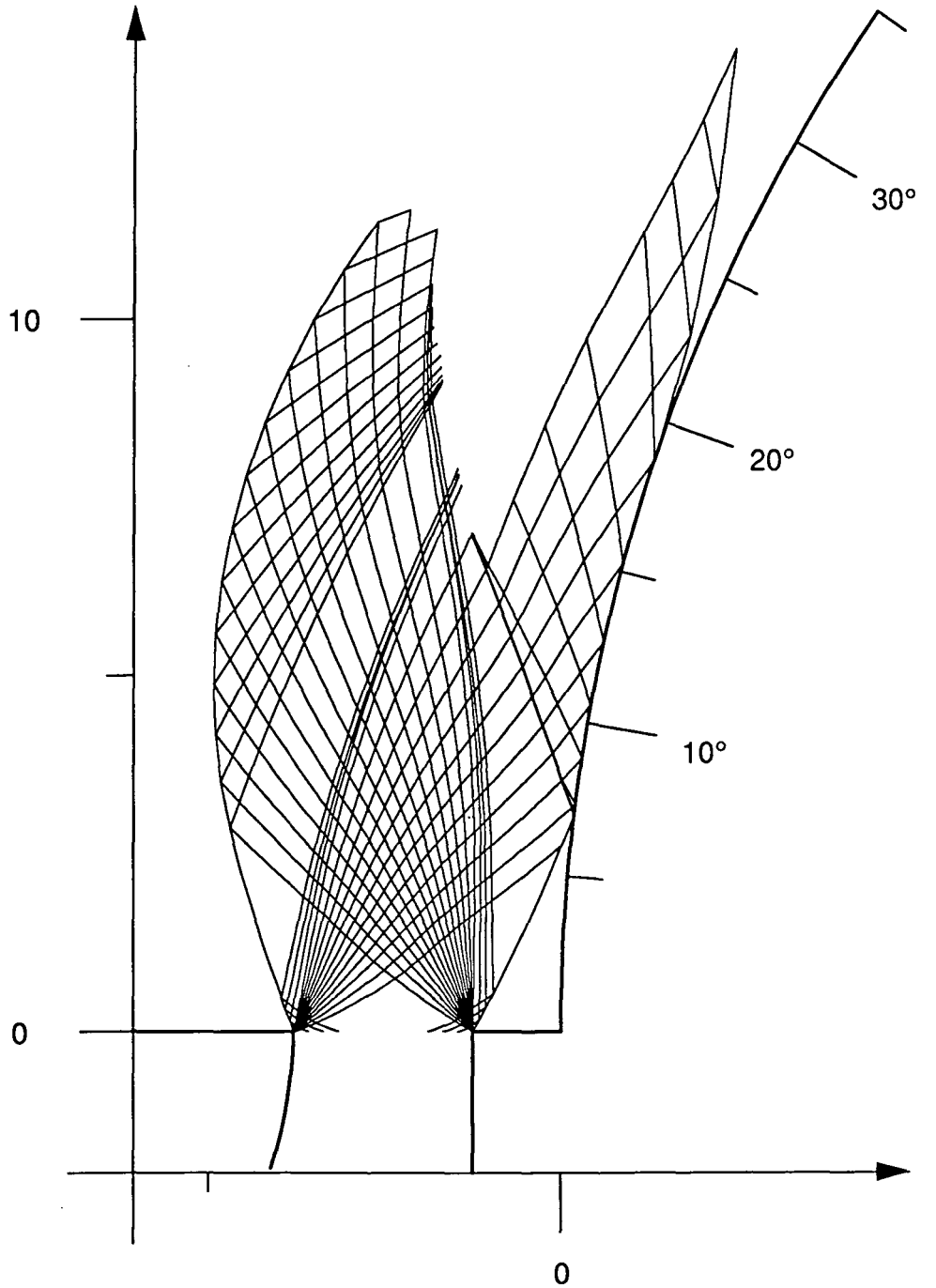


Figure 8.2.13. Axisymmetric Coanda Model
Method of Characteristics Plot
Shock Fitting; Separation Model
Base Pressure Model
Slot = 2.54 mm Step = 1.25 mm
Patm/Po = 0.163

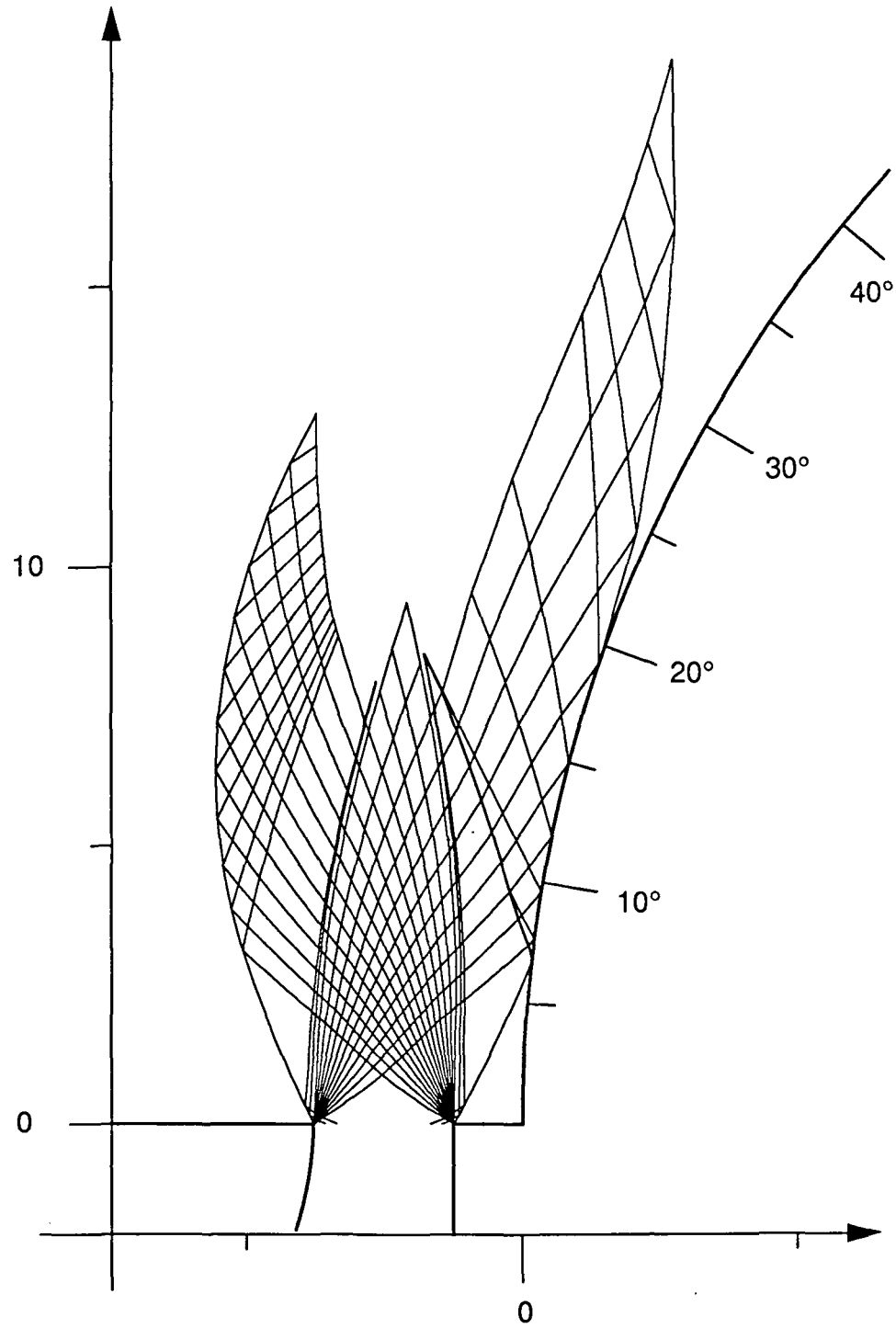


Figure 8.2.14.

Axisymmetric Coanda Model
Method of Characteristics Plot
Shock Fitting; Separation Model
Base Pressure Model
Slot = 2.54 mm Step = 1.25 mm
Patm/Po = 0.125

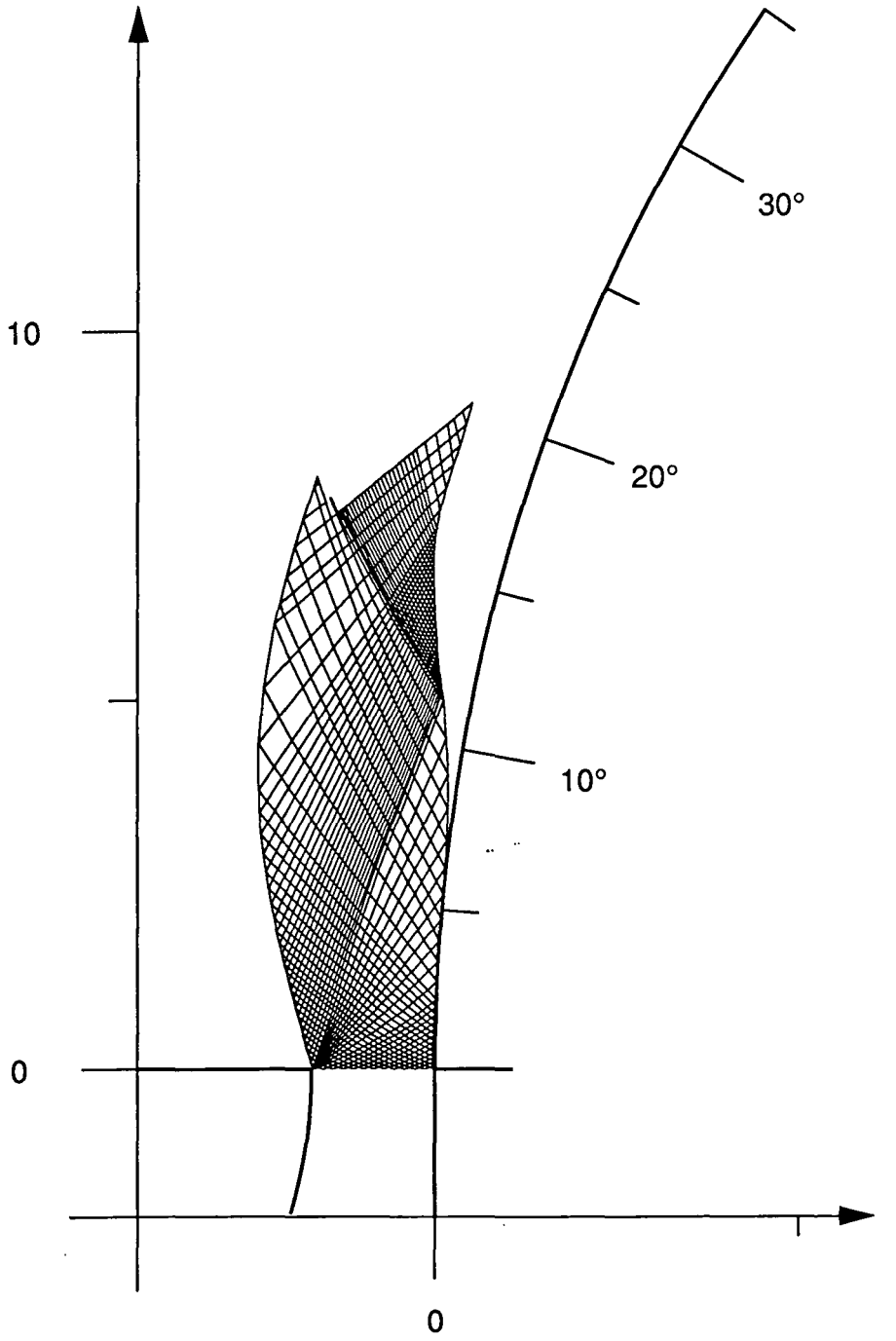


Figure 8.2.15.

Axisymmetric Coanda Model
Method of Characteristics Plot
Shock Fitting; Experimental Surface Pressures
Slot = 1.67 mm Step = 0.00 mm
Patm/Po = 0.202

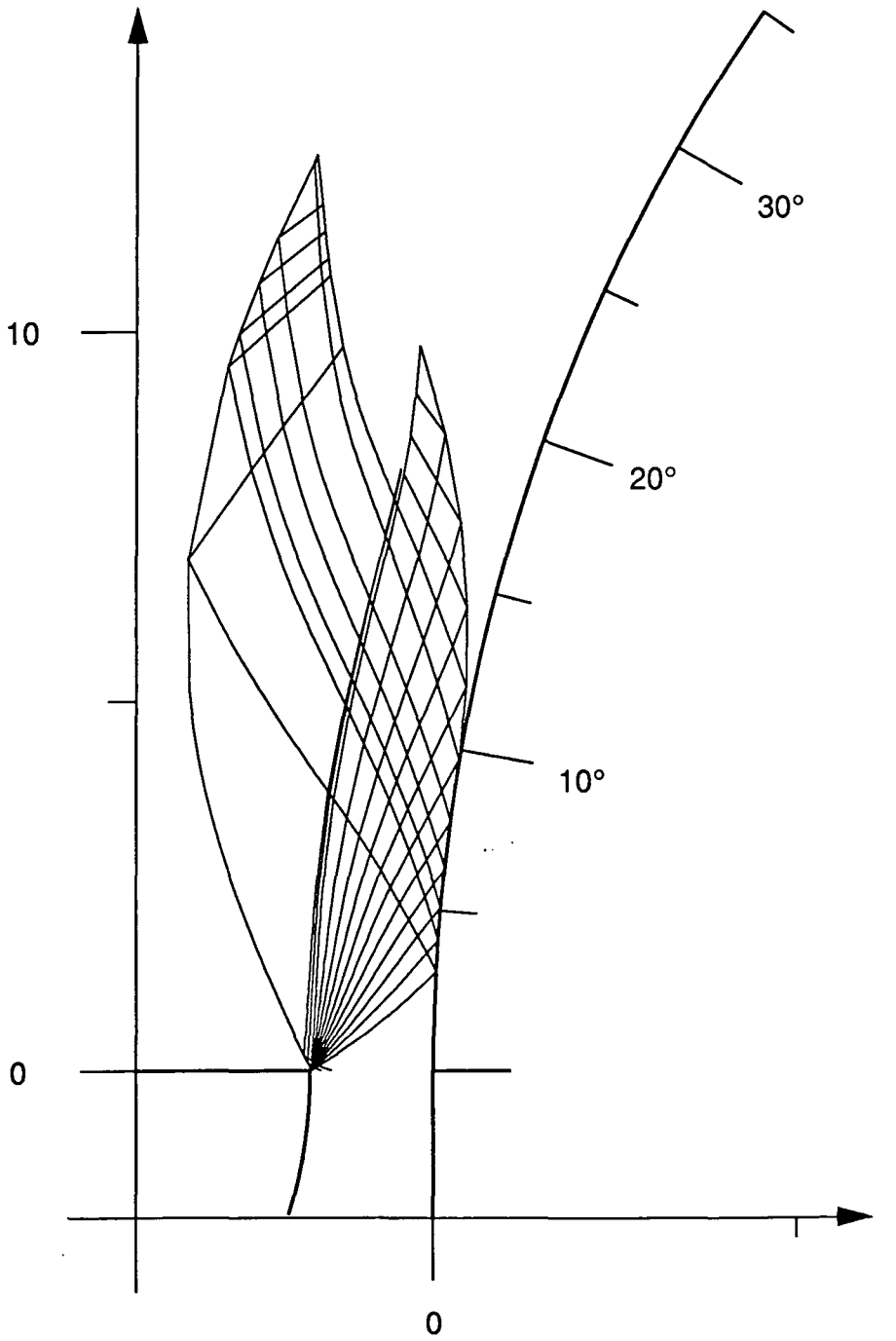


Figure 8.2.16.

Axisymmetric Coanda Model
Method of Characteristics Plot
Shock Fitting; Experimental Surface Pressures
Slot = 1.67 mm Step = 0.00 mm
Patm/Po = 0.124

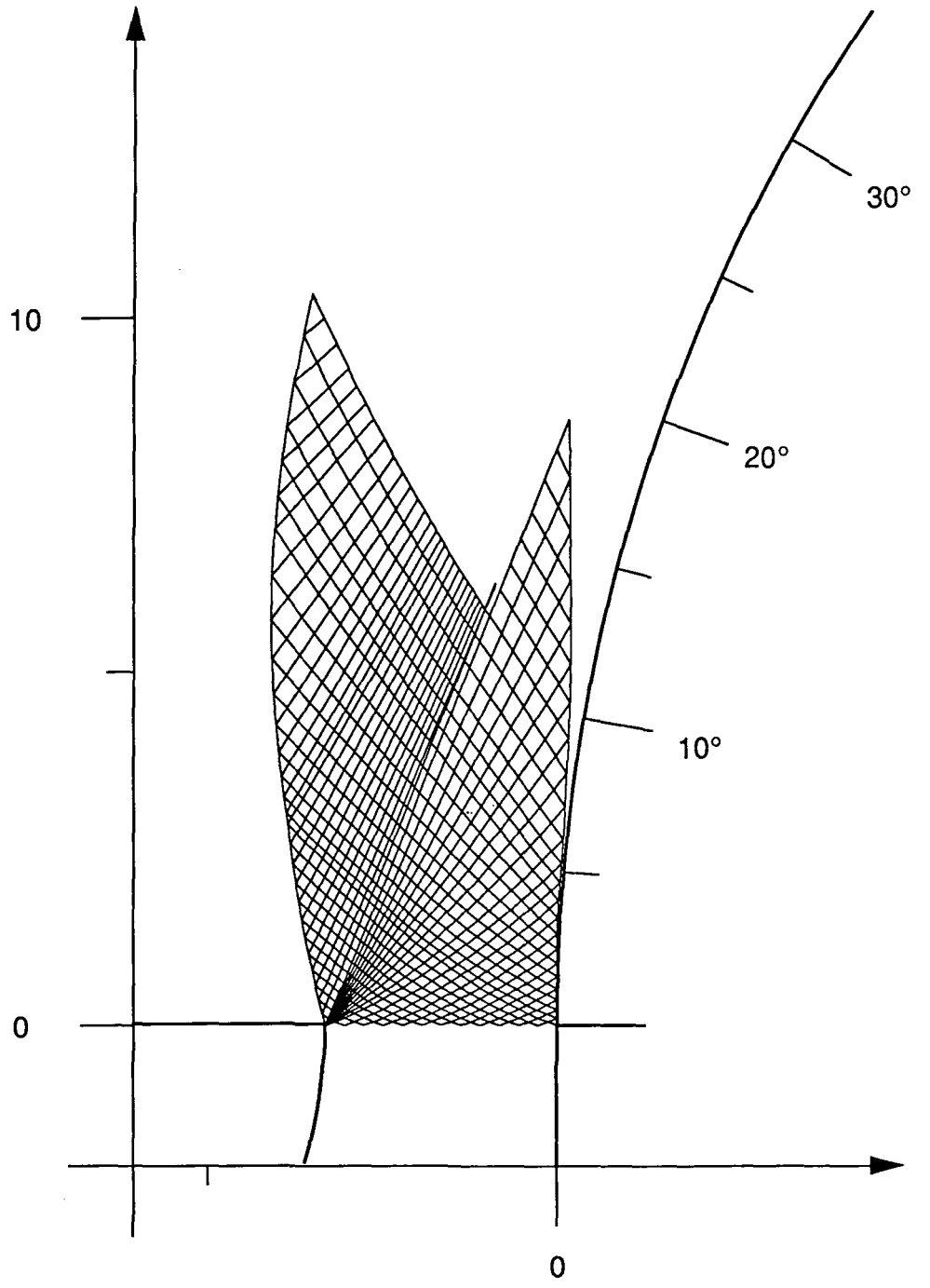


Figure 8.2.17. Axisymmetric Coanda Model
Method of Characteristics Plot
Shock Fitting; Experimental Surface Pressures
Slot = 3.33 mm Step = 0.00 mm
Patm/Po = 0.233

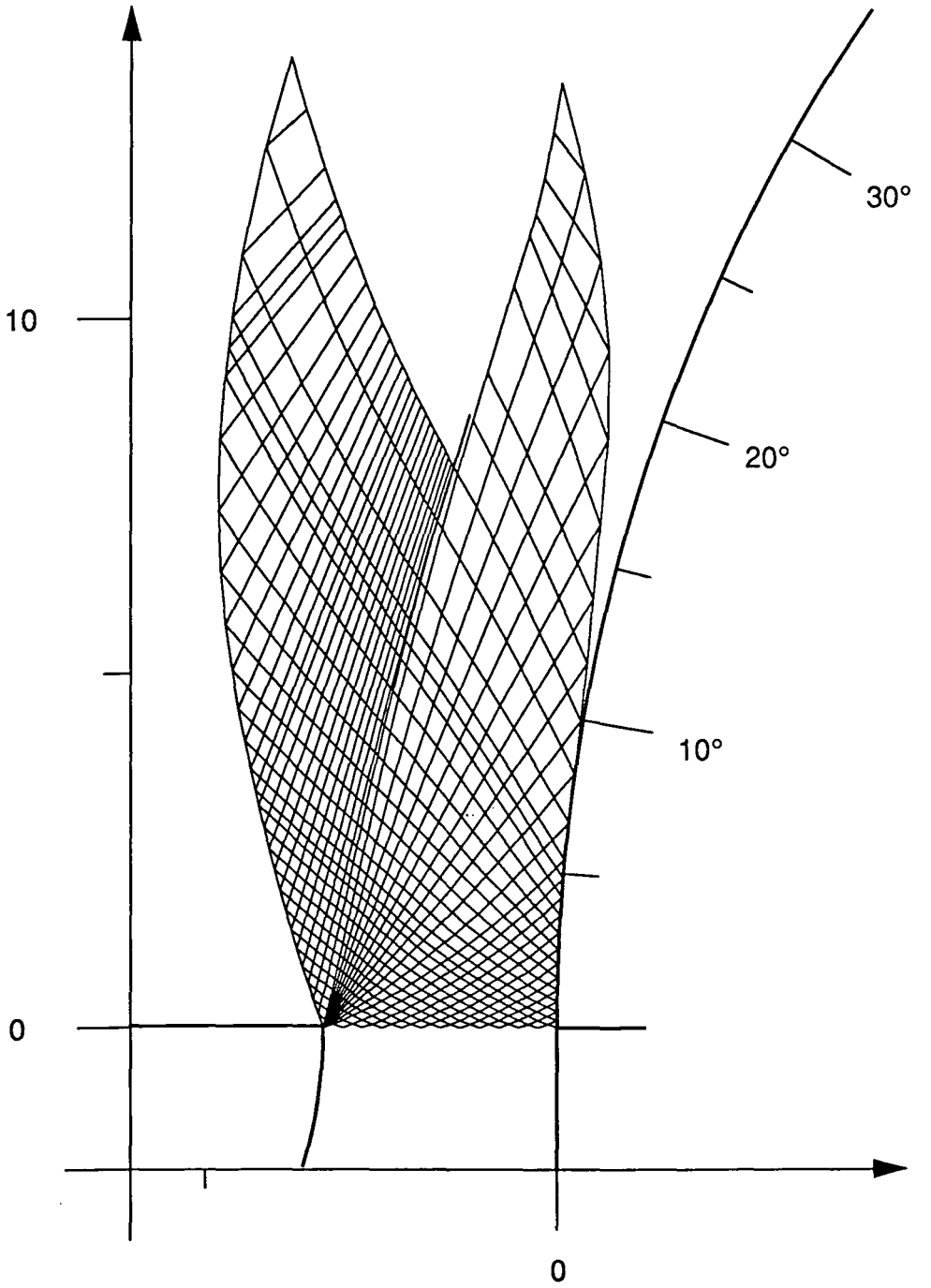


Figure 8.2.18. Axisymmetric Coanda Model
Method of Characteristics Plot
Shock Fitting; Experimental Surface Pressures
Slot = 3.33 mm Step = 0.00 mm
Patm/Po = 0.174

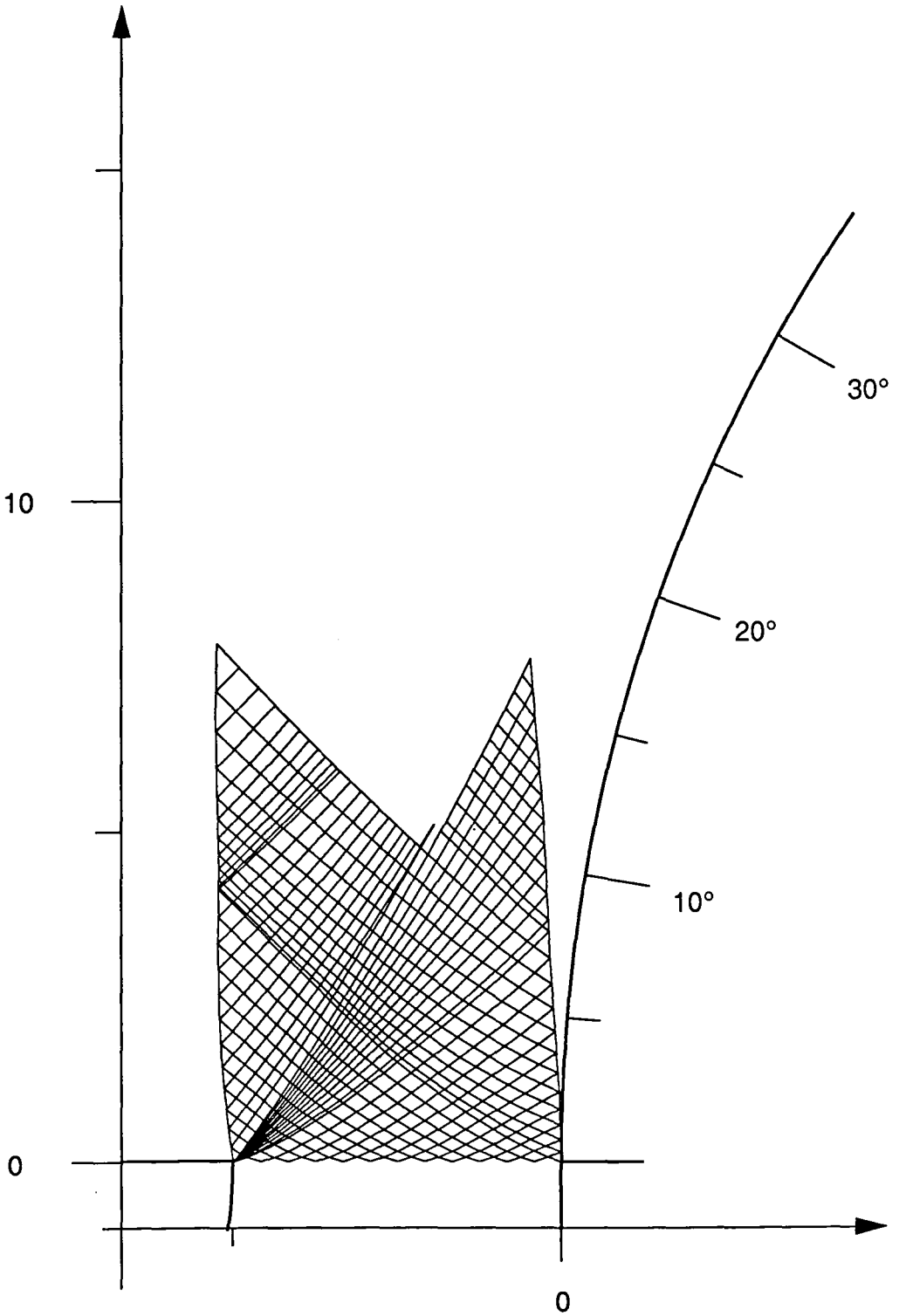


Figure 8.2.19. Axisymmetric Coanda Model
Method of Characteristics Plot

Shock Fitting; Experimental Surface Pressures
Slot = 5.00 mm Step = 0.00 mm
Patm/Po = 0.314

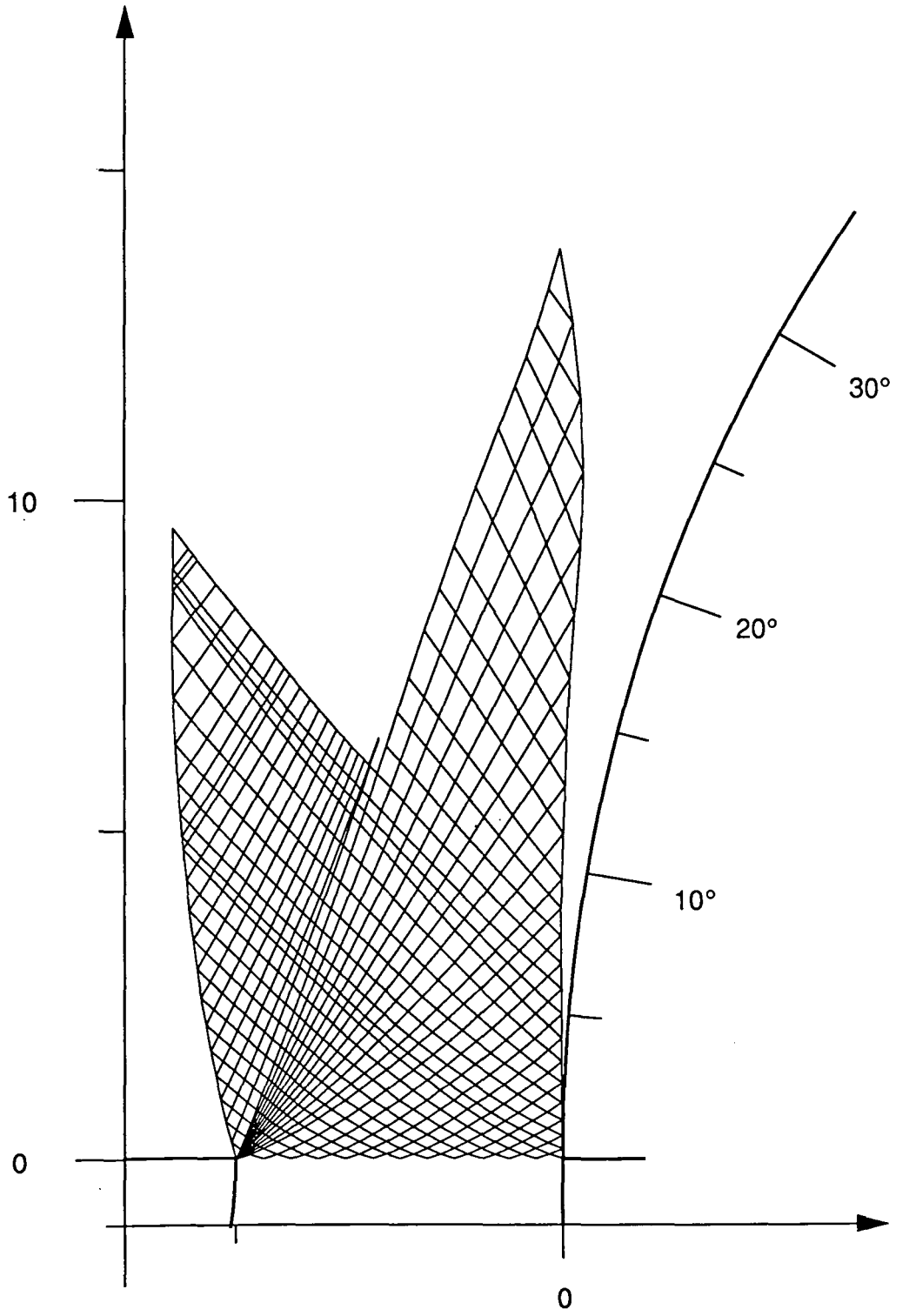


Figure 8.2.20. Axisymmetric Coanda Model
Method of Characteristics Plot
Shock Fitting; Experimental Surface Pressures
Slot = 5.00 mm Step = 0.00 mm
Patm/Po = 0.225

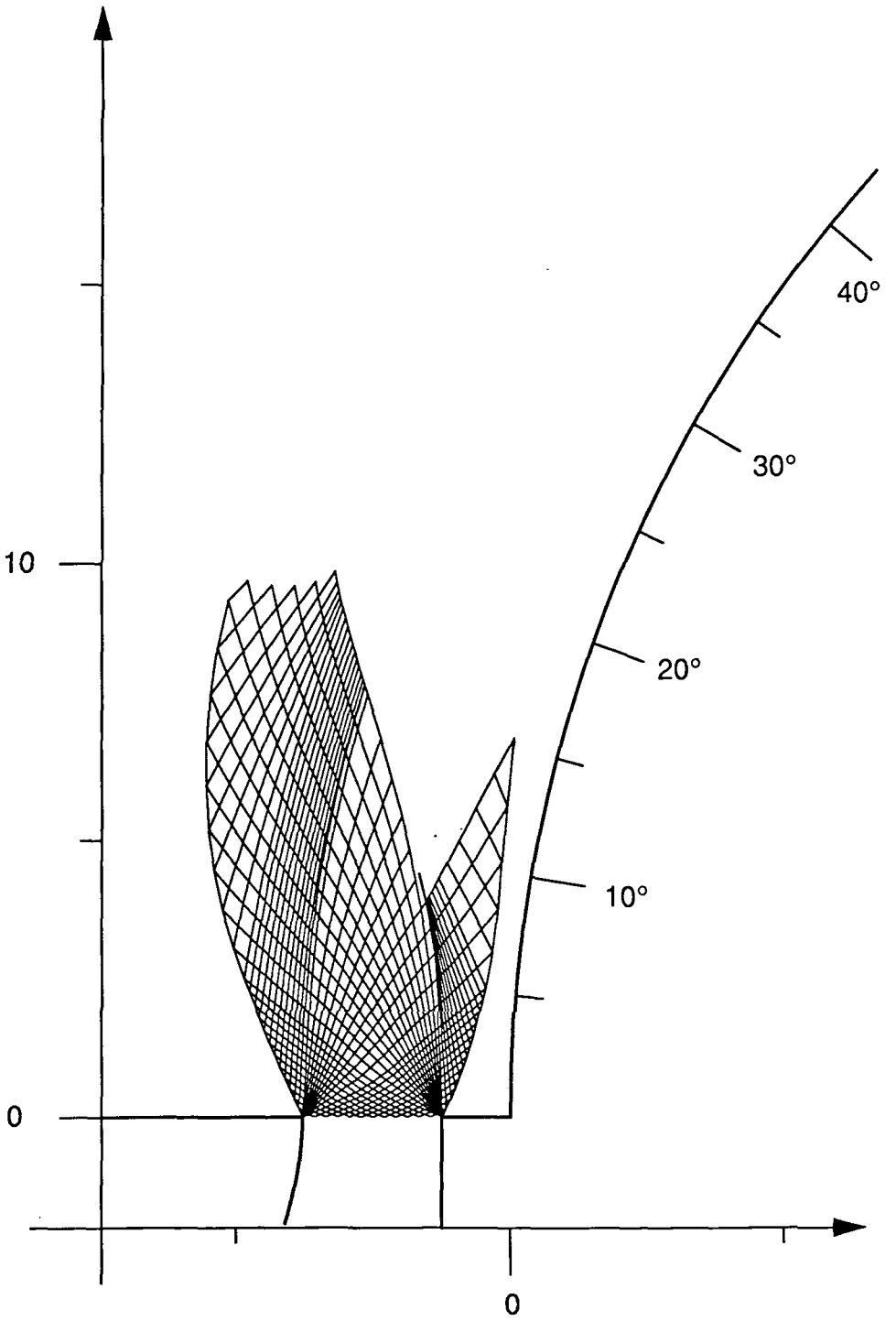


Figure 8.2.21.

Axisymmetric Coanda Model
Method of Characteristics Plot
Shock Fitting; Experimental Surface Pressures
Slot = 2.54 mm Step = 1.25 mm
Patm/Po = 0.125

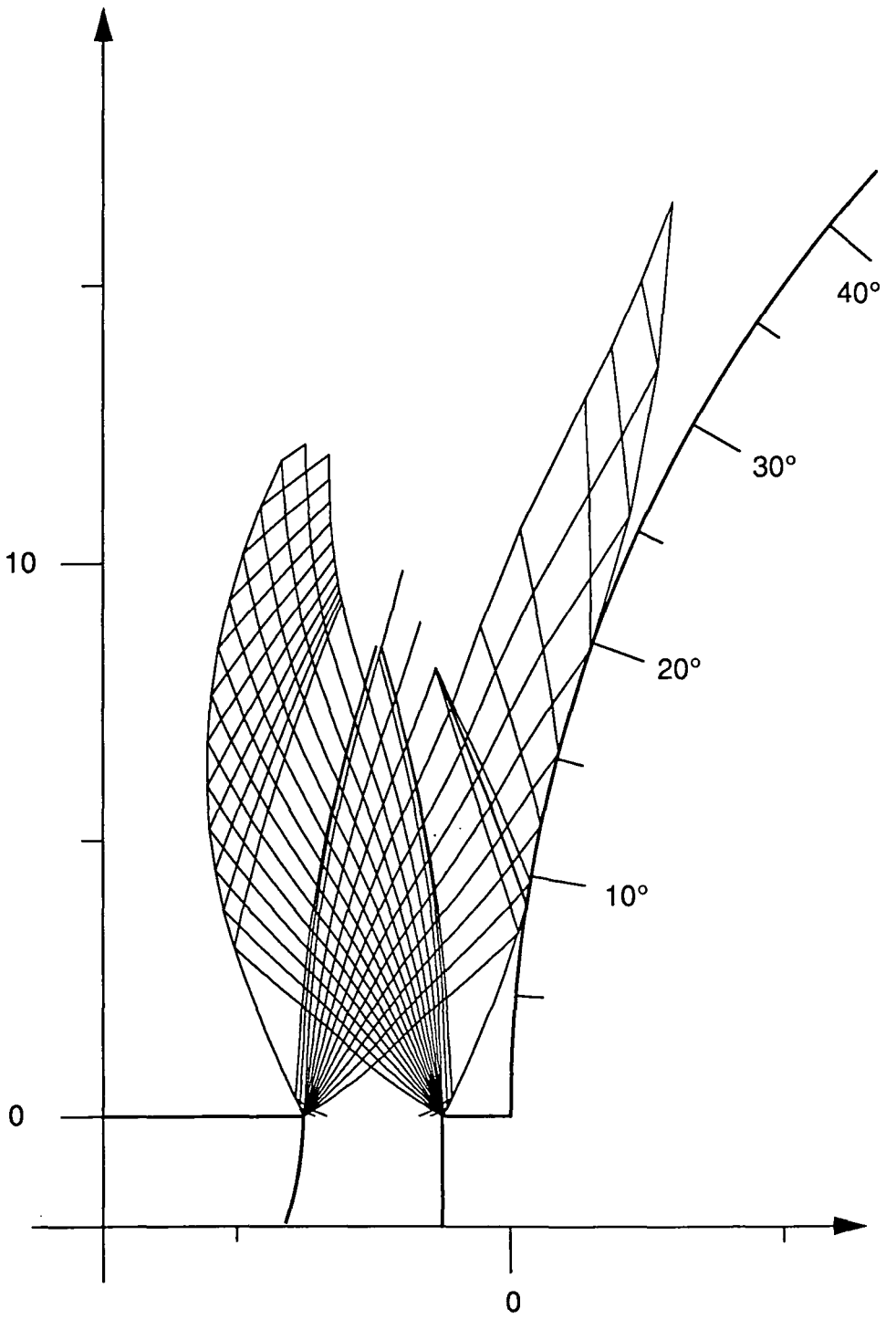


Figure 8.2.22.

Axisymmetric Coanda Model
Method of Characteristics Plot
Shock Fitting; Separation Model
Experimental Base Pressure
Slot = 2.54 mm Step = 1.25 mm
Patm/Po = 0.125

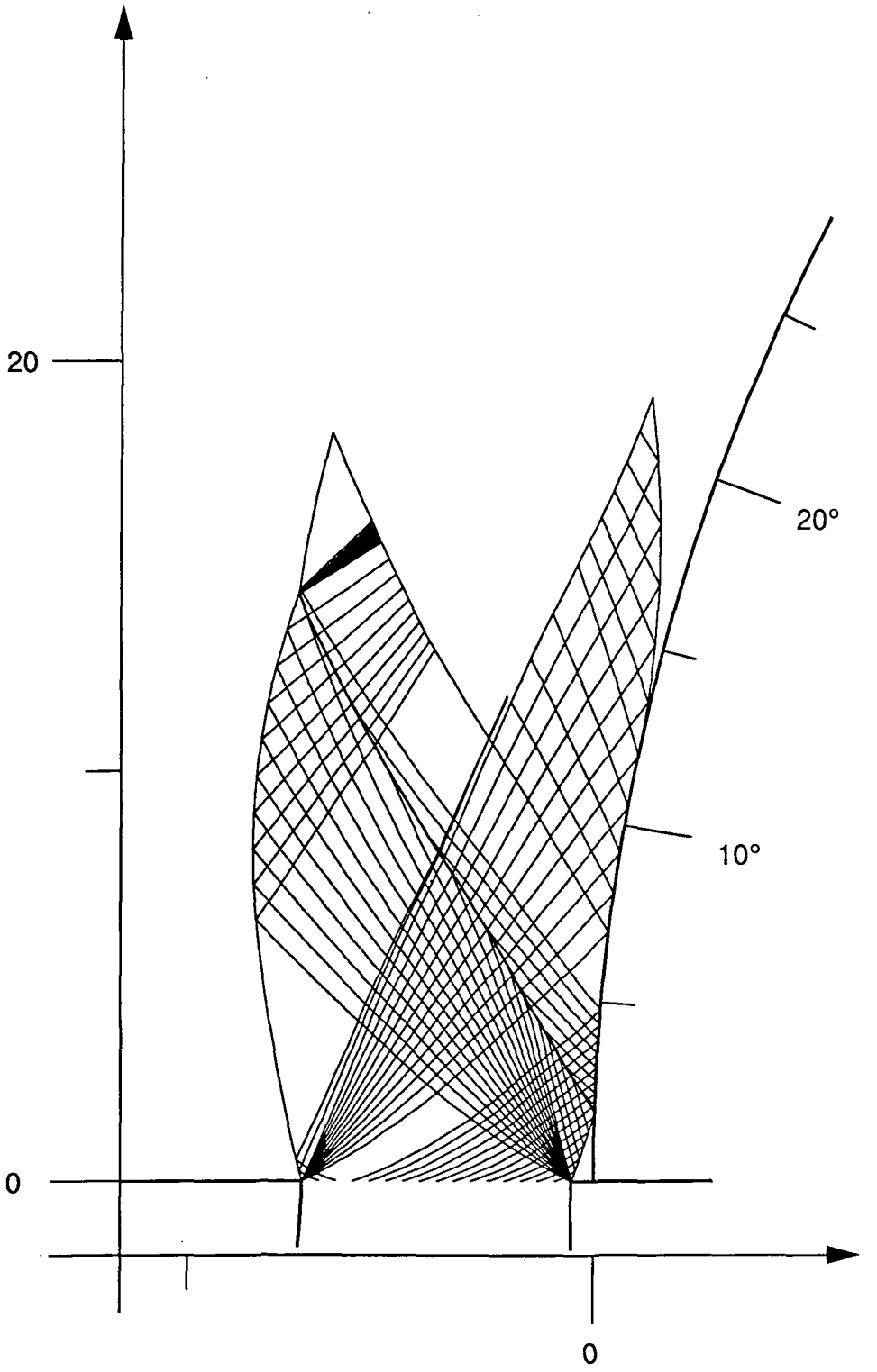


Figure 8.2.23. I8 Coanda (Field Tests)
Method of Characteristics Plot
Shock Fitting; Separation Model
Base Pressure Model
Slot = 6.65 mm Step = 0.55 mm
Patm/Po = 0.252

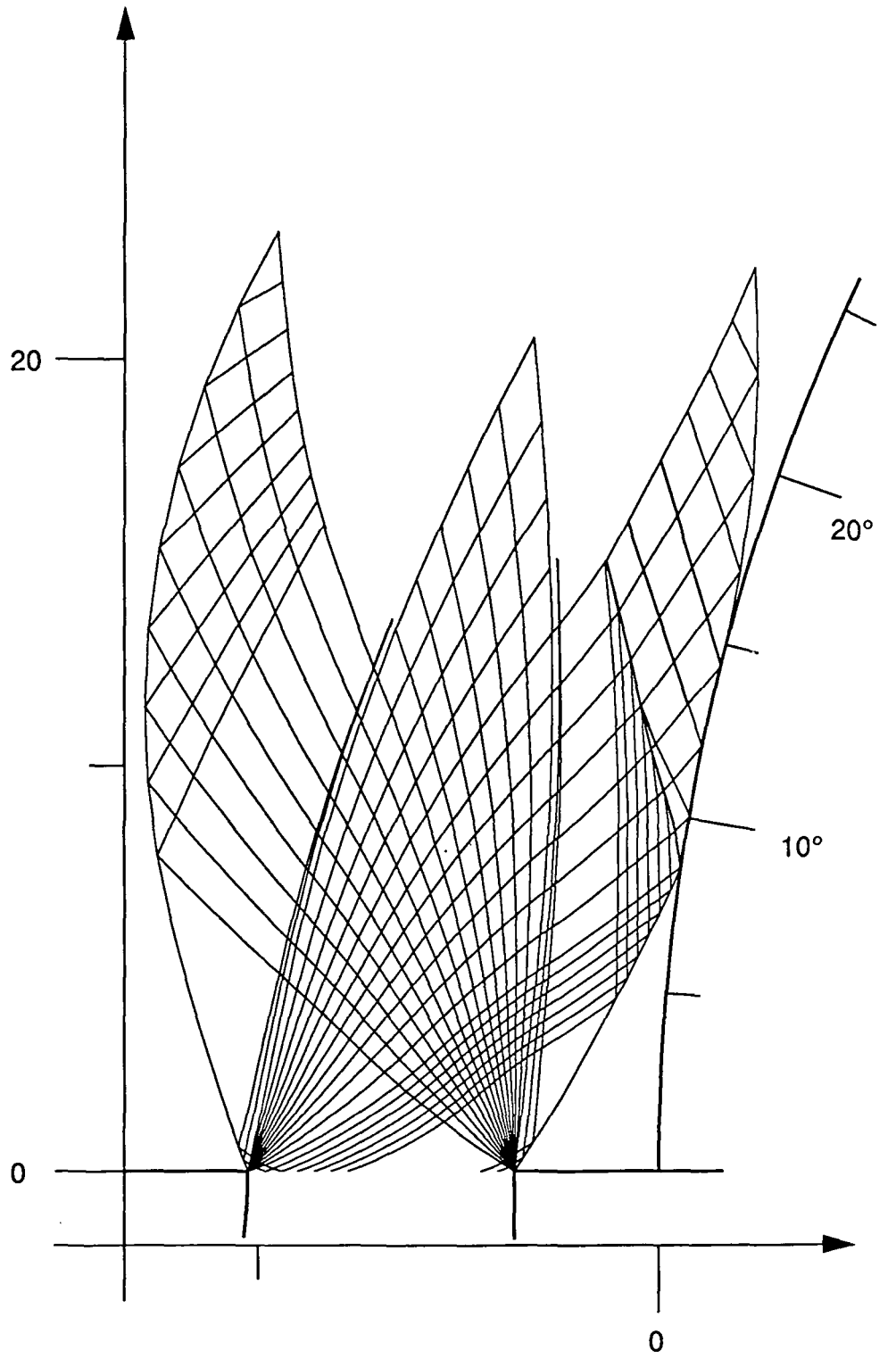


Figure 8.2.24. I8 Coanda (Field Tests)
Method of Characteristics Plot
Shock Fitting; Separation Model
Base Pressure Model
Slot = 6.65 mm Step = 3.60 mm
Patm/Po = 0.184

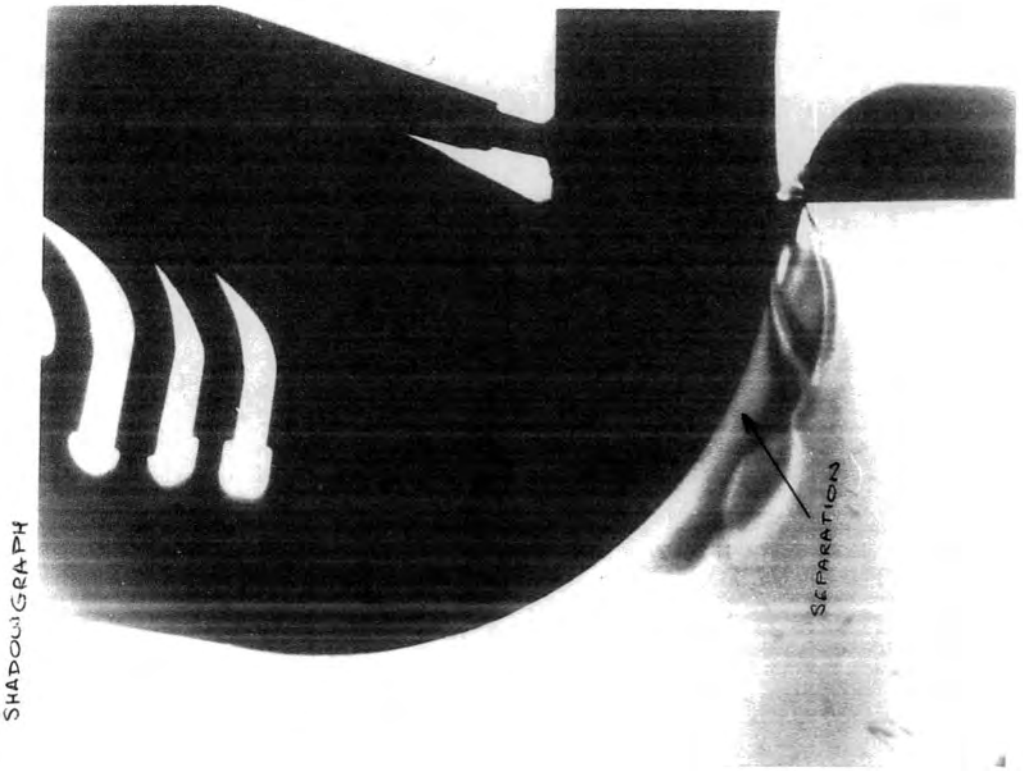


Plate 1a SLOT 2.00 STEP 0.00
C_{p_0} 0.176

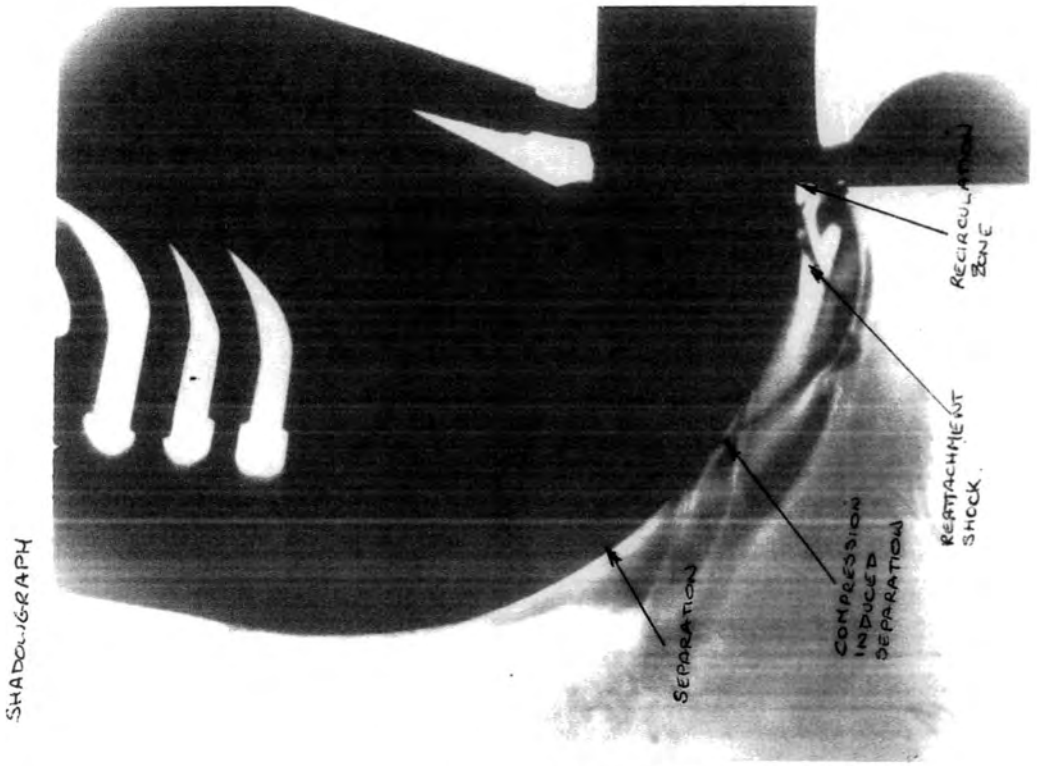


Plate 1b SLOT 2.00 STEP .50
C_{p_0} 0.124

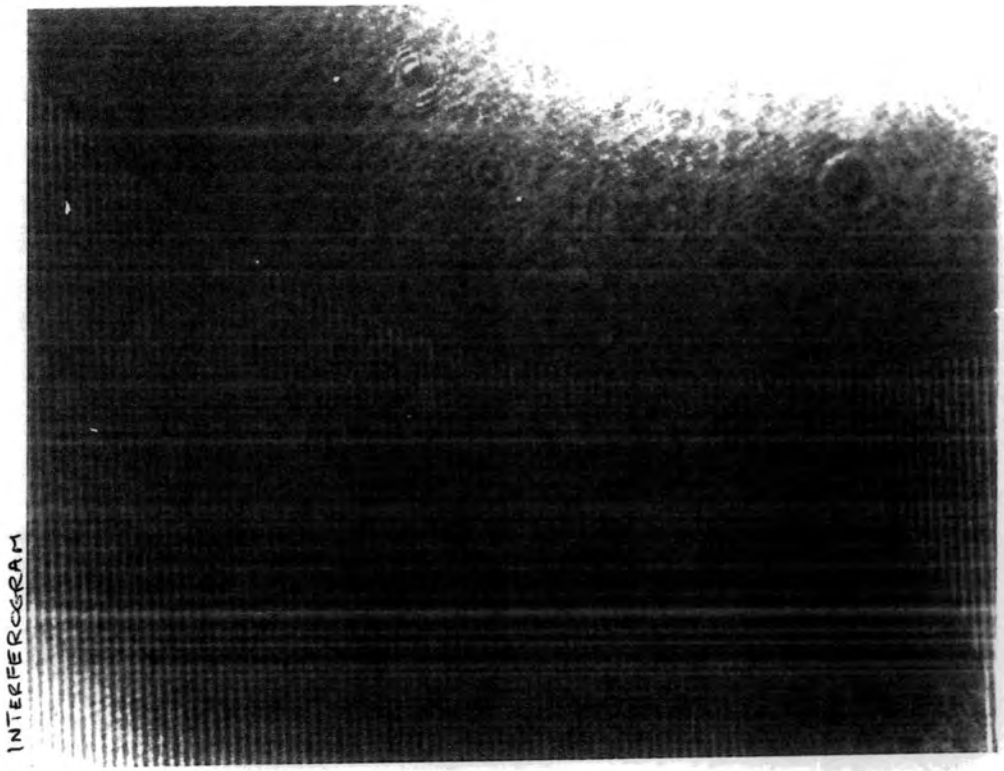


Plate 2a SLOT 4.00 STEP 0.00
NO FLOW

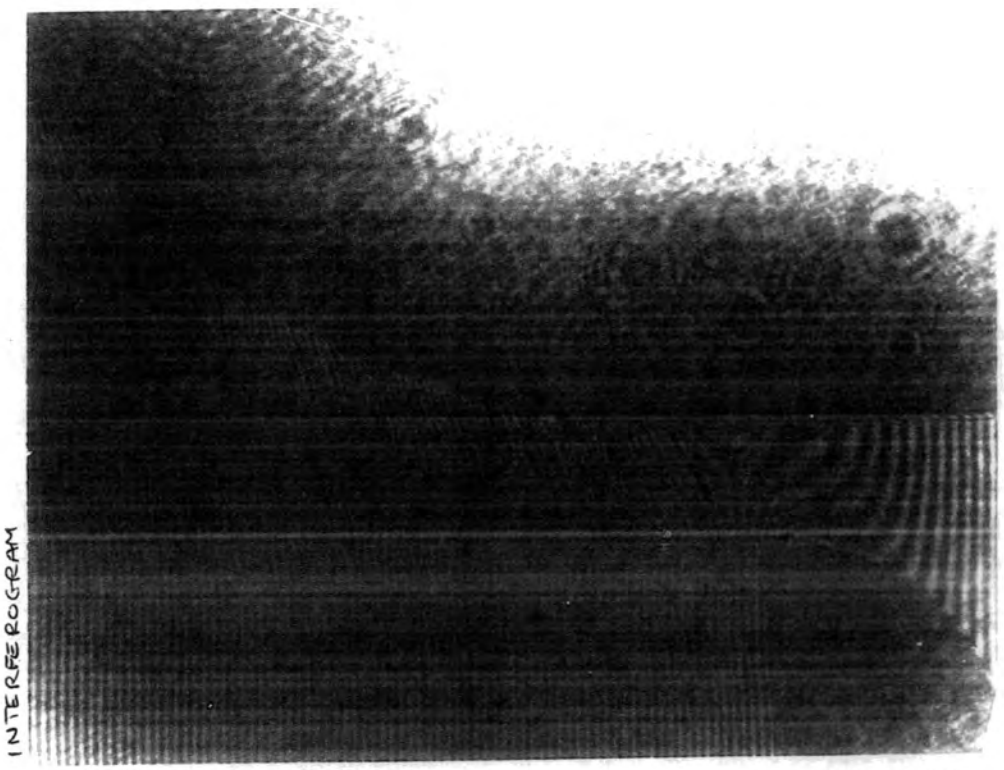


Plate 2b SLOT 4.00 STEP 000
C_{p_0} 0.488

Plate 3a SLOT 4.00 STEP 0.00
C_{po} 0.525

Plate 3b SLOT 4.00 STEP 0.00
C_{po} 0.256

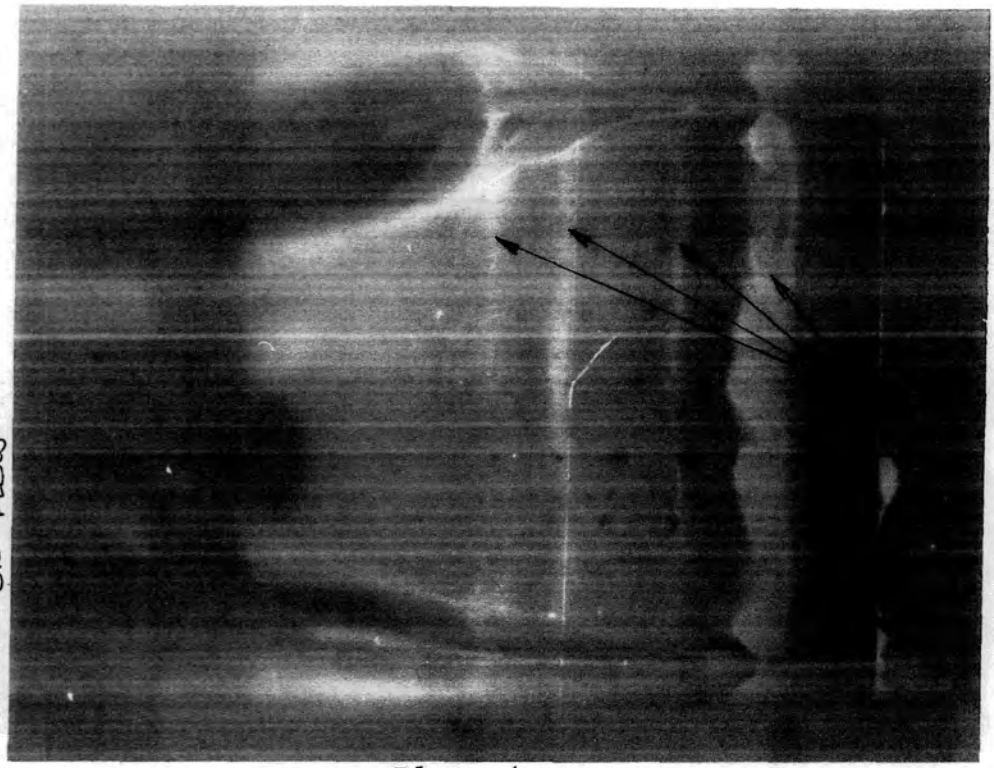


Plate 4a SLOT 4.00 STEP 0.00
C_{p_o} 0.324

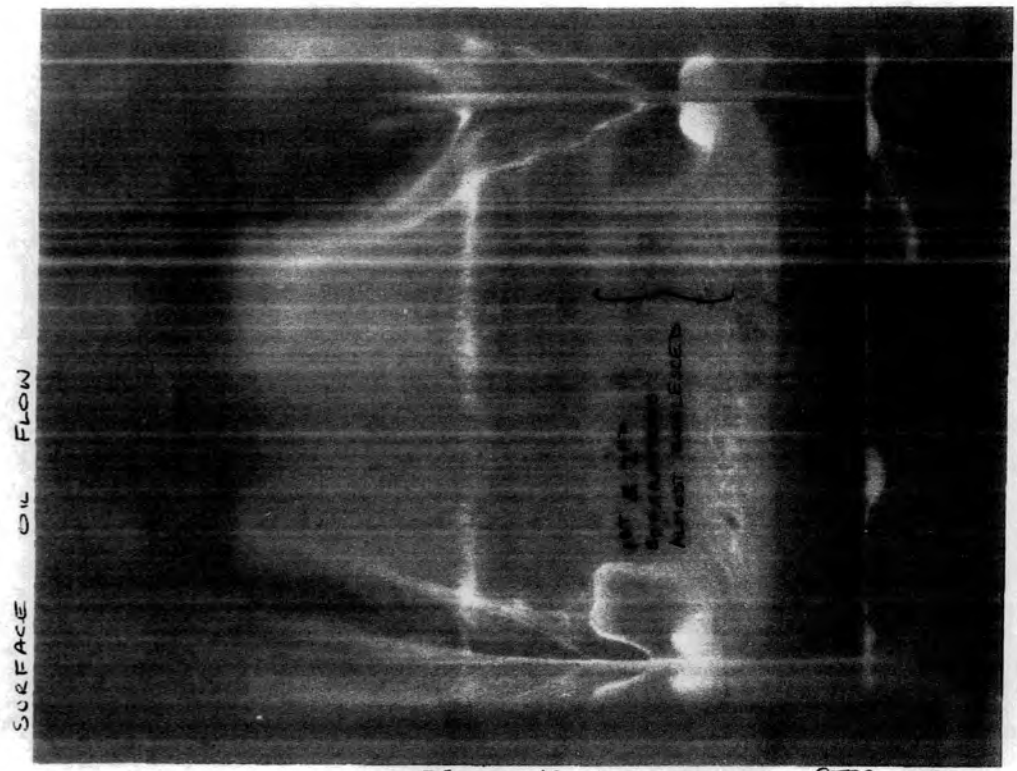


Plate 4b SLOT 4.00 STEP 0.00
C_{p_o} 0.256

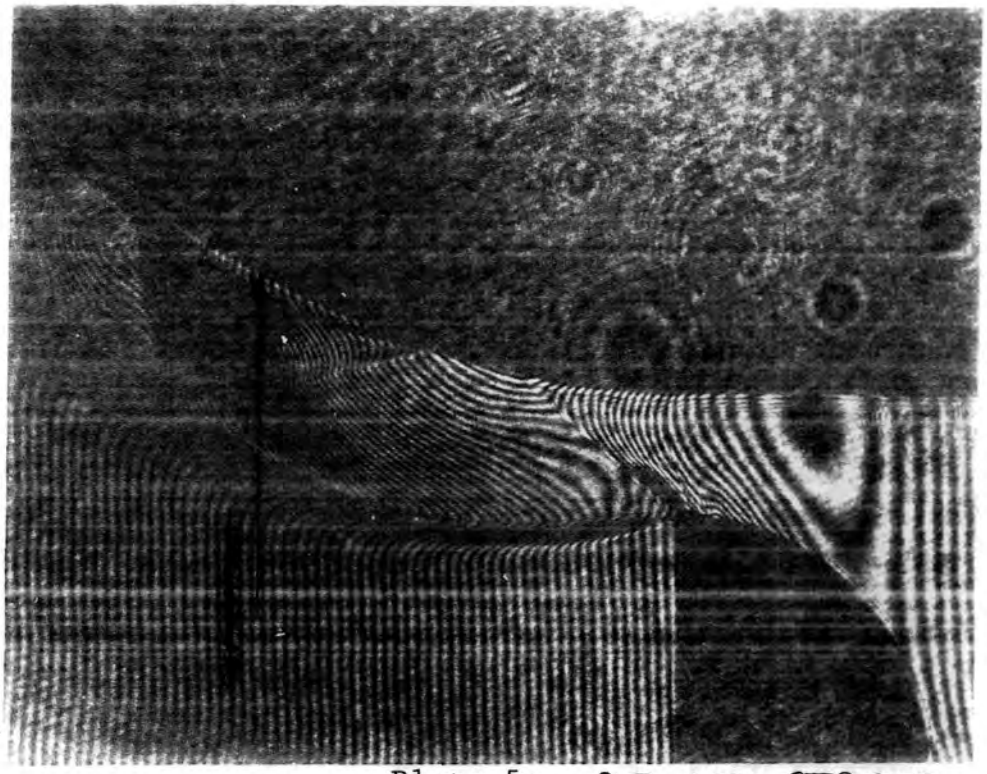


Plate 5a SLOT 4.00 STEP 0.00
C_{p_0} 0.312

Plate 5b SLOT 4.00 STEP 1.50
C_{p_0} 0.331

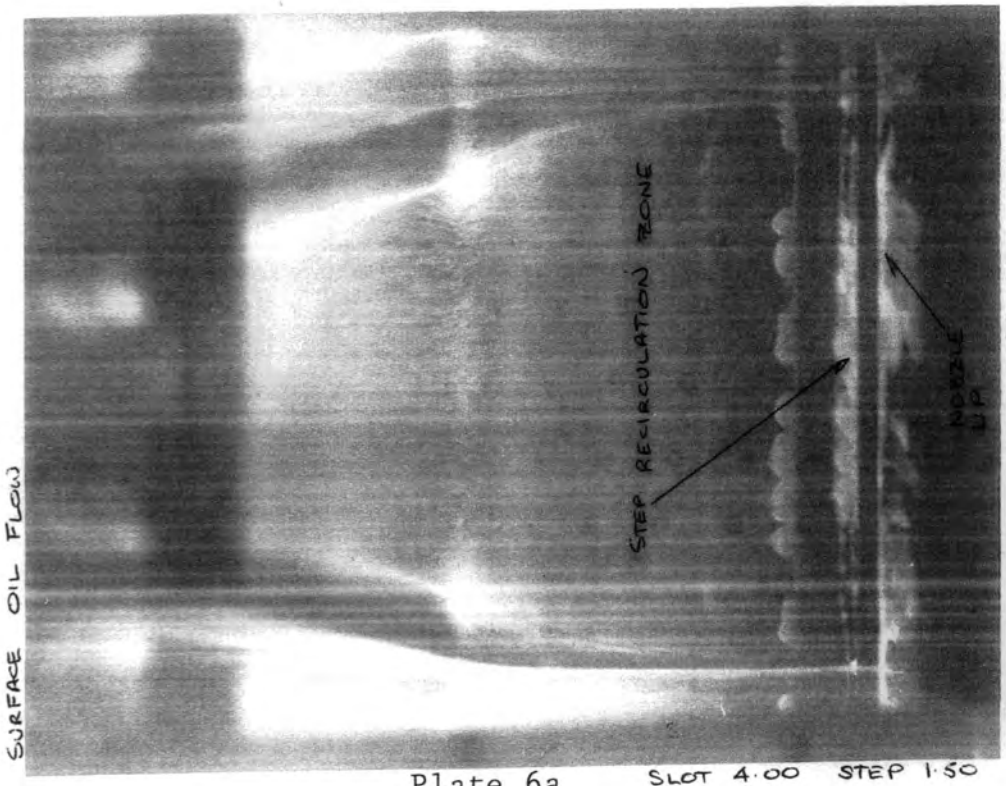


Plate 6a SLOT 4.00 STEP 1.50
C_{p_0} 0.331

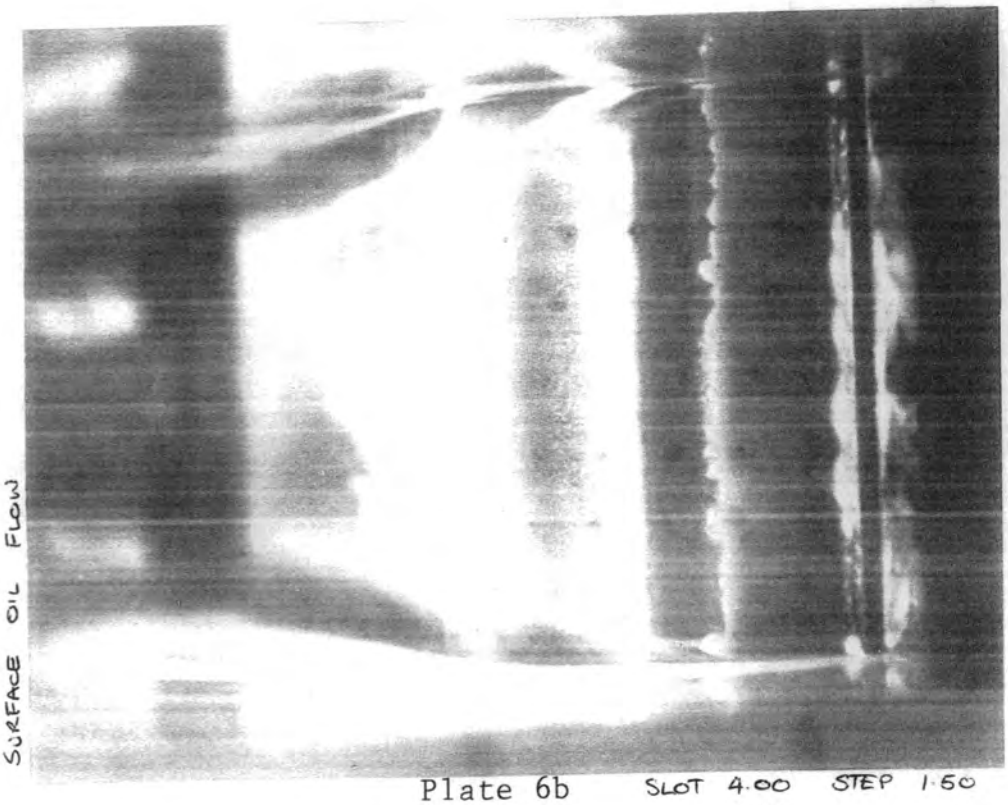


Plate 6b SLOT 4.00 STEP 1.50
C_{p_0} 0.256

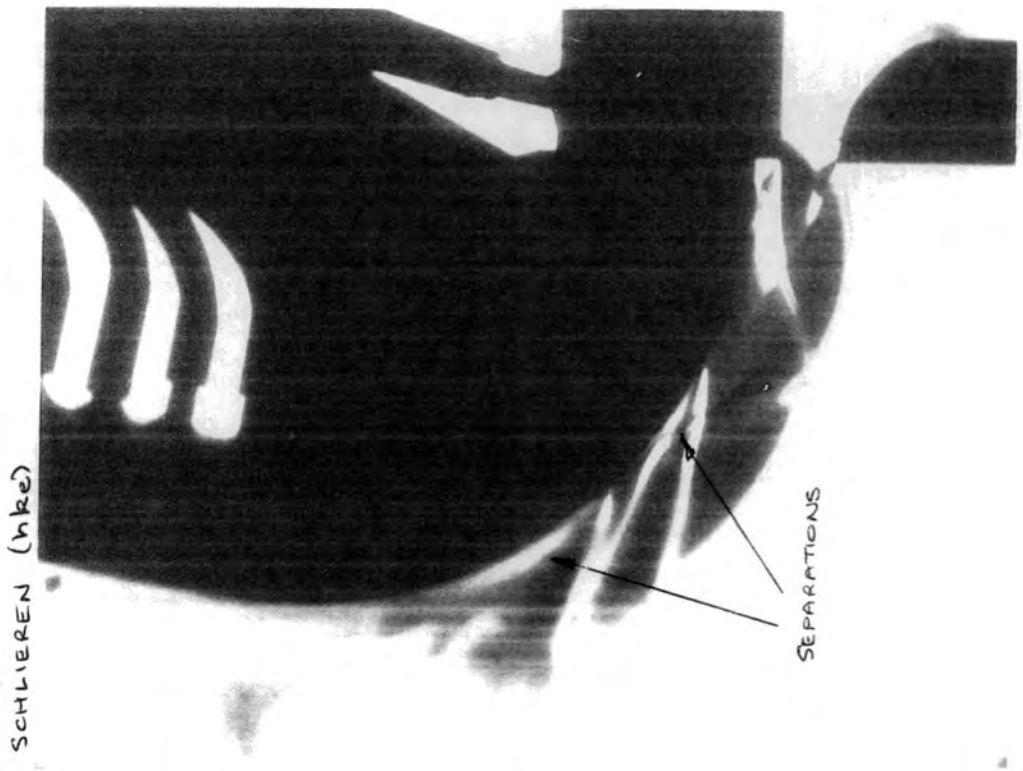


Plate 7a SLOT 4.00 STEP 1.50
C_{p_0} 0.212

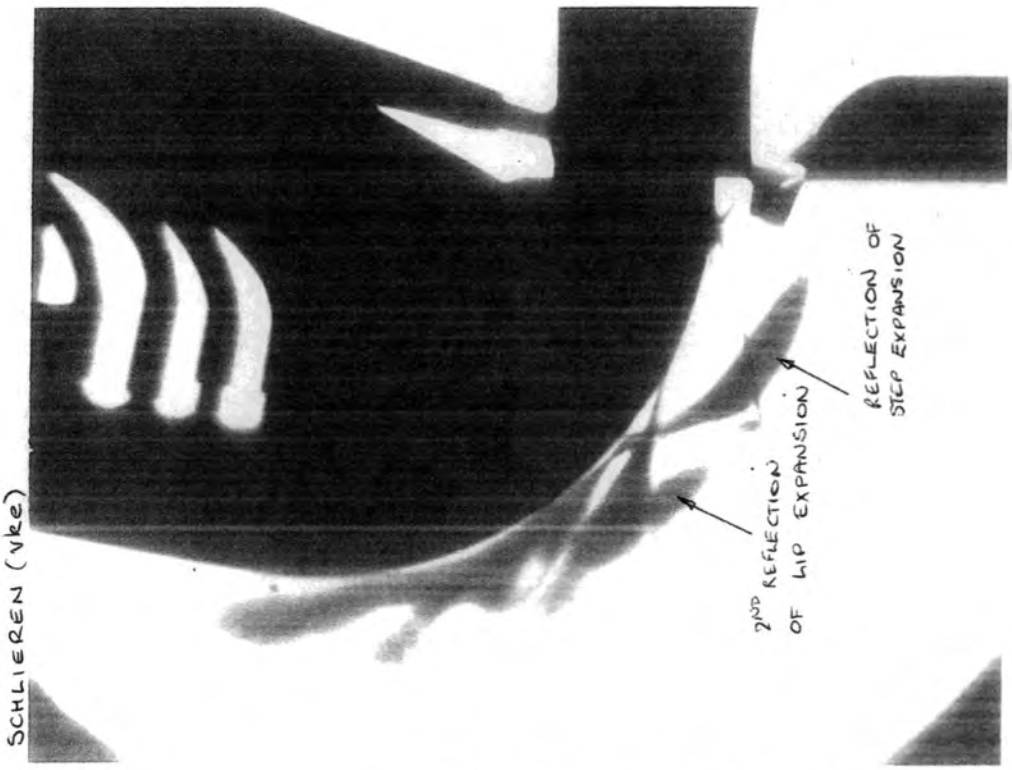


Plate 7b SLOT 4.00 STEP 2.55
C_{p_0} 0.205

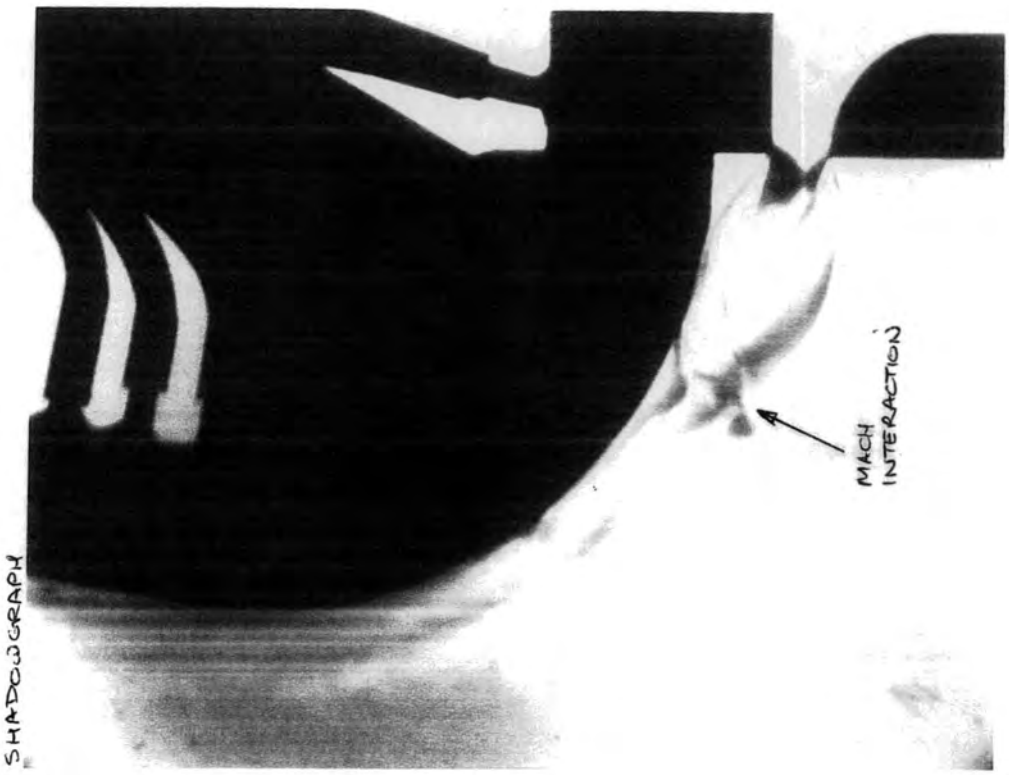


Plate 8a SLOT 4.00 STEP 3.76
C_{p_0} 0.228

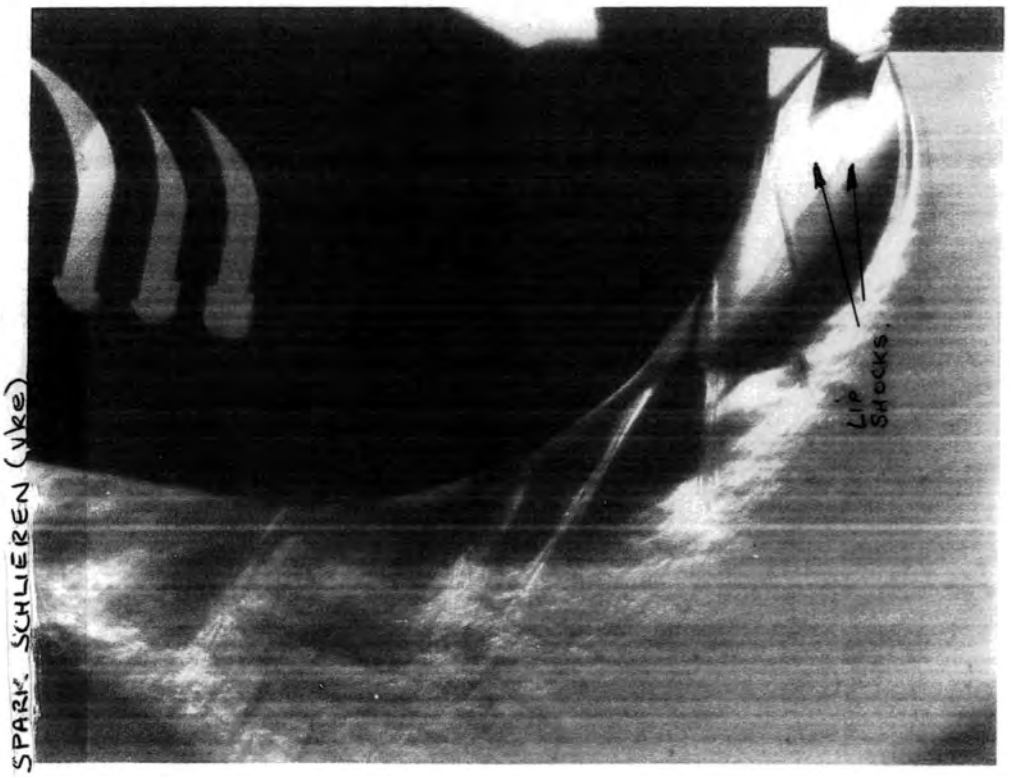


Plate 8b SLOT 4.00 STEP 3.76
C_{p_0} 0.191

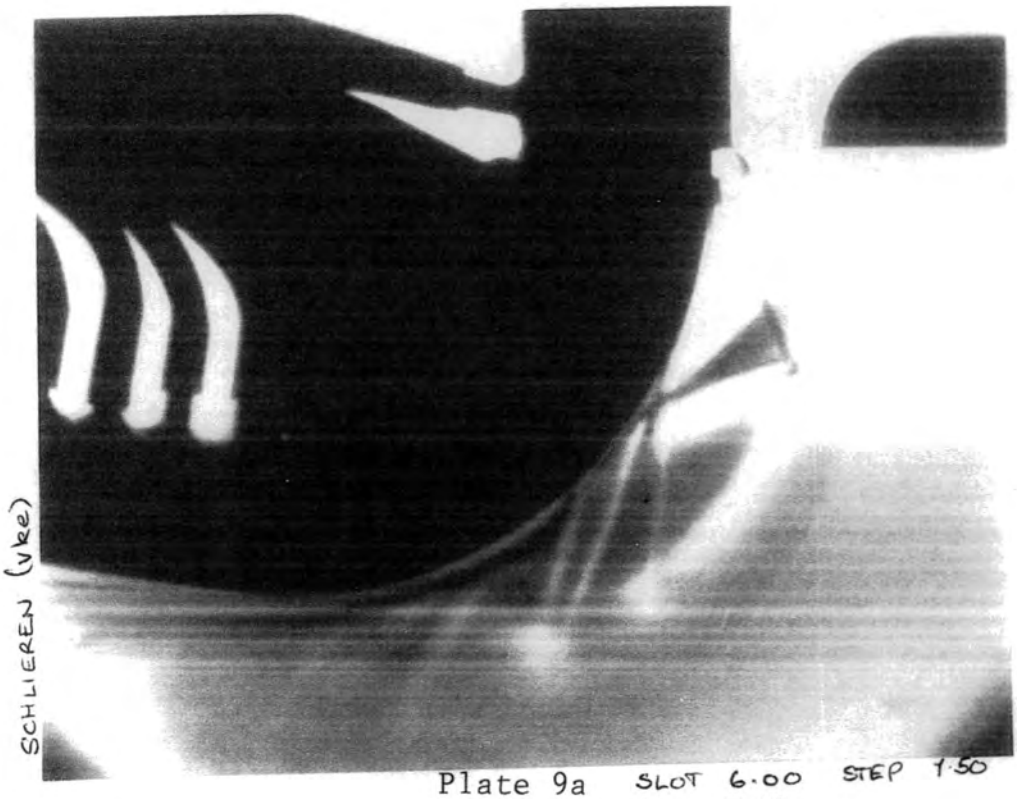


Plate 9a SLOT 6.00 STEP 1.50
C_{p_0} 0.290

Plate 9b SLOT 6.00 STEP 3.75
C_{p_0} 0.315

Plate 10a SLOT 8.00 STEP 1.49
C_{p_0} 0.359

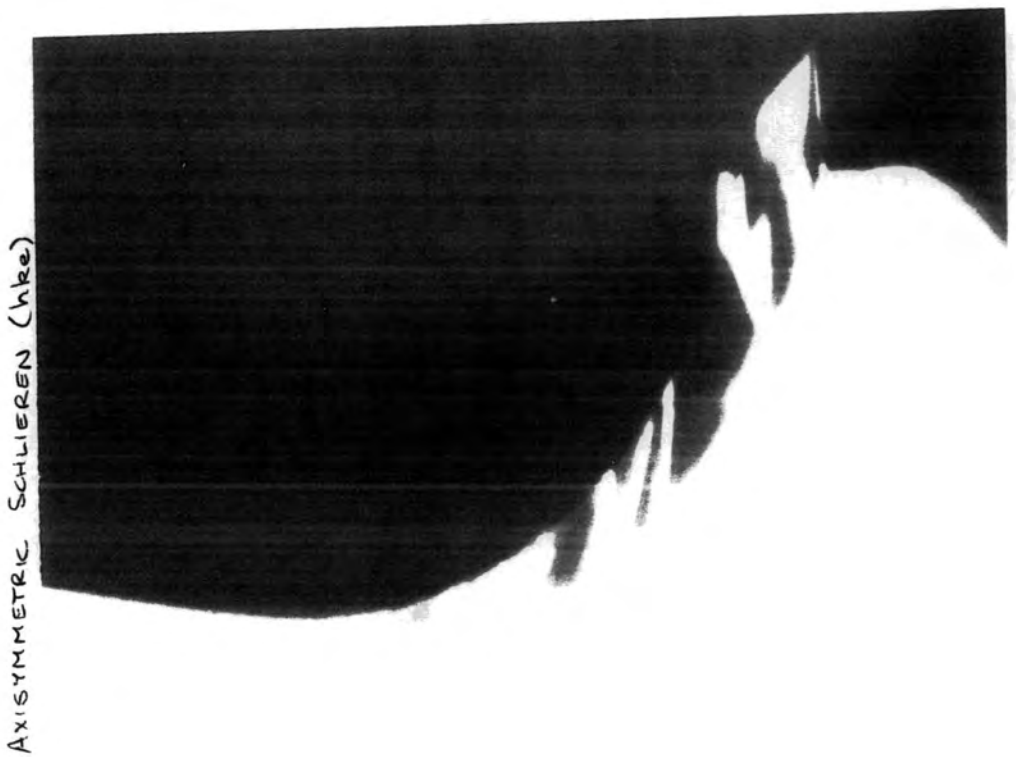


Plate 10b SLOT 5.00 STEP 1.25
C_{p_0} 0.207

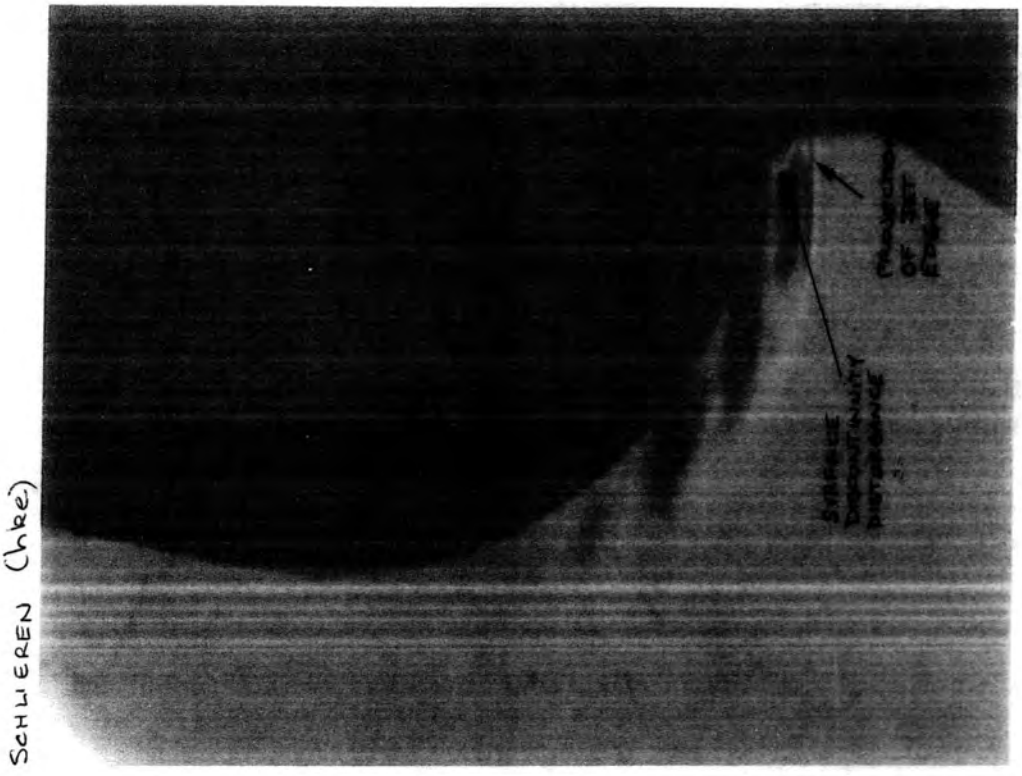


Plate 11a SLOT 1.67 STEP 0.00
C_{p_0} 0.124

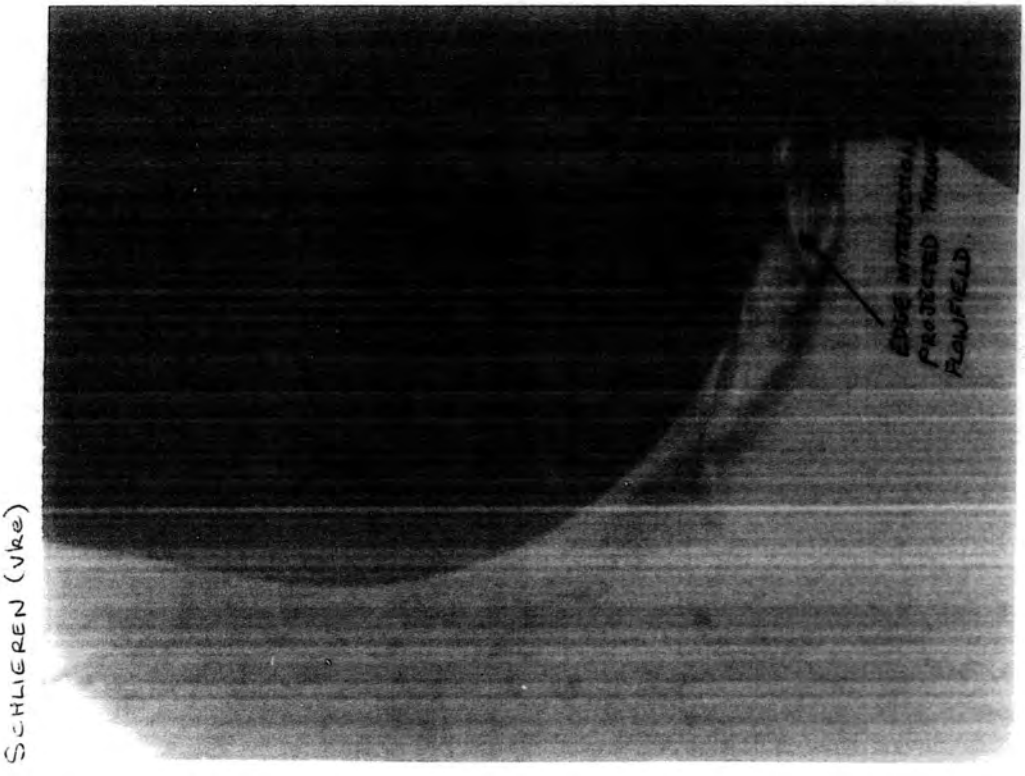


Plate 11b SLOT 1.67 STEP .25
C_{p_0} 0.105

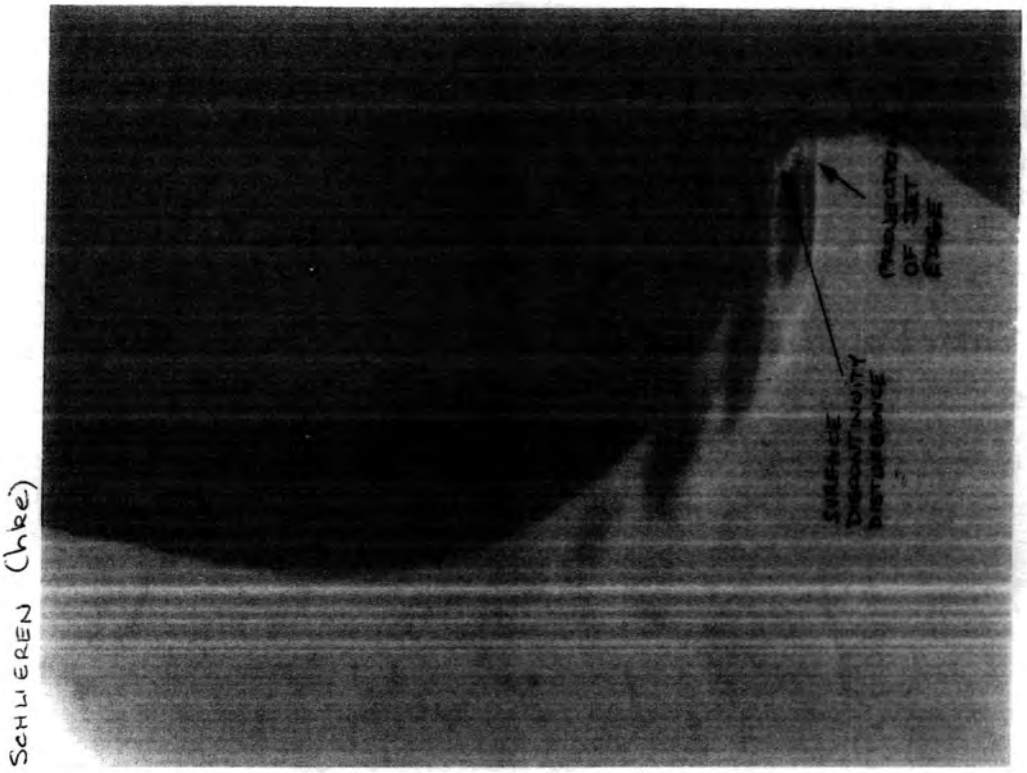


Plate 11a SLOT 1.67 STEP 0.00
C_{p0} 0.124

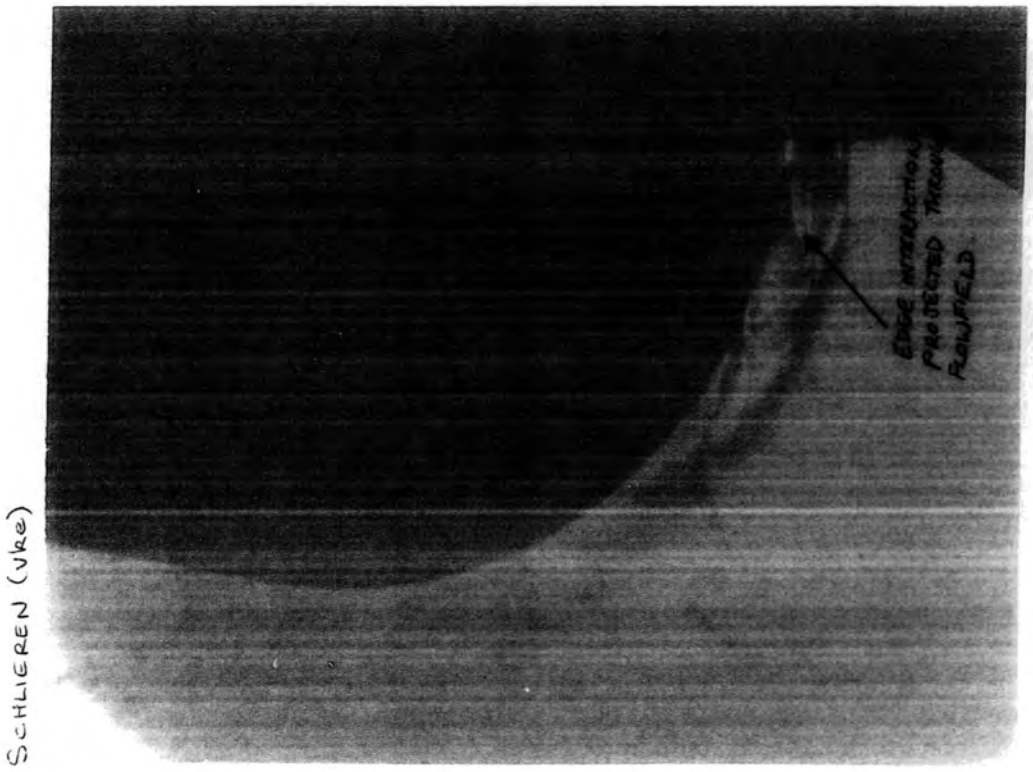


Plate 11b SLOT 1.67 STEP .25
C_{p0} 0.105

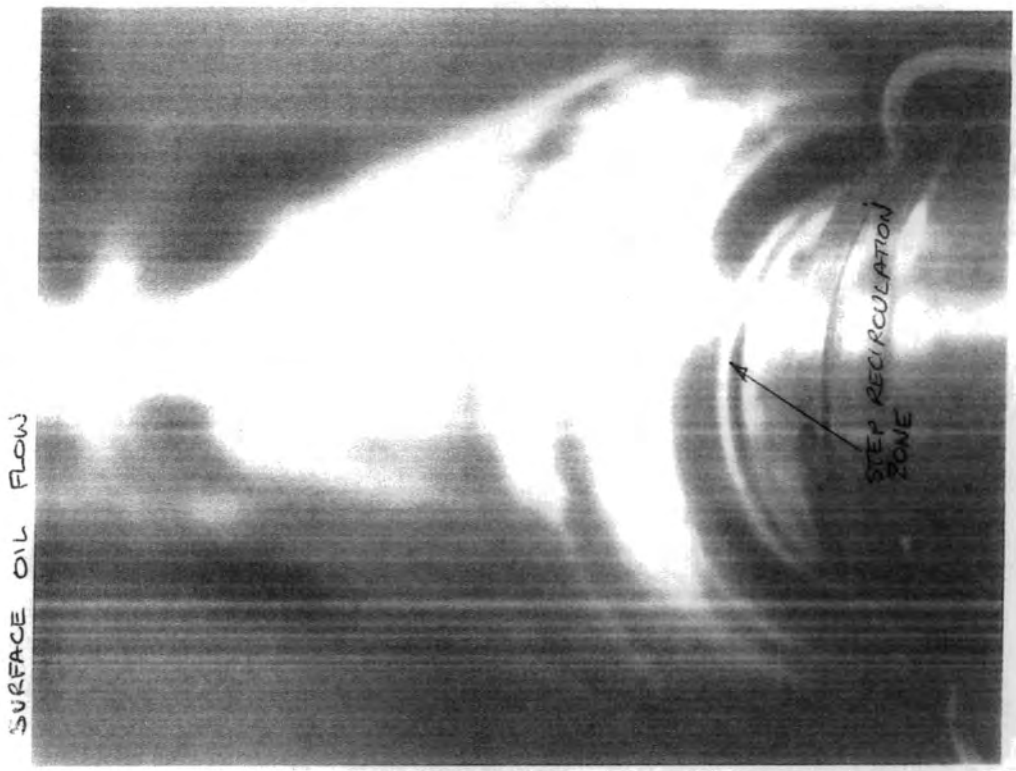


Plate 13a SLOT 2·54 STEP 1·25
C_{p_0} 0·125

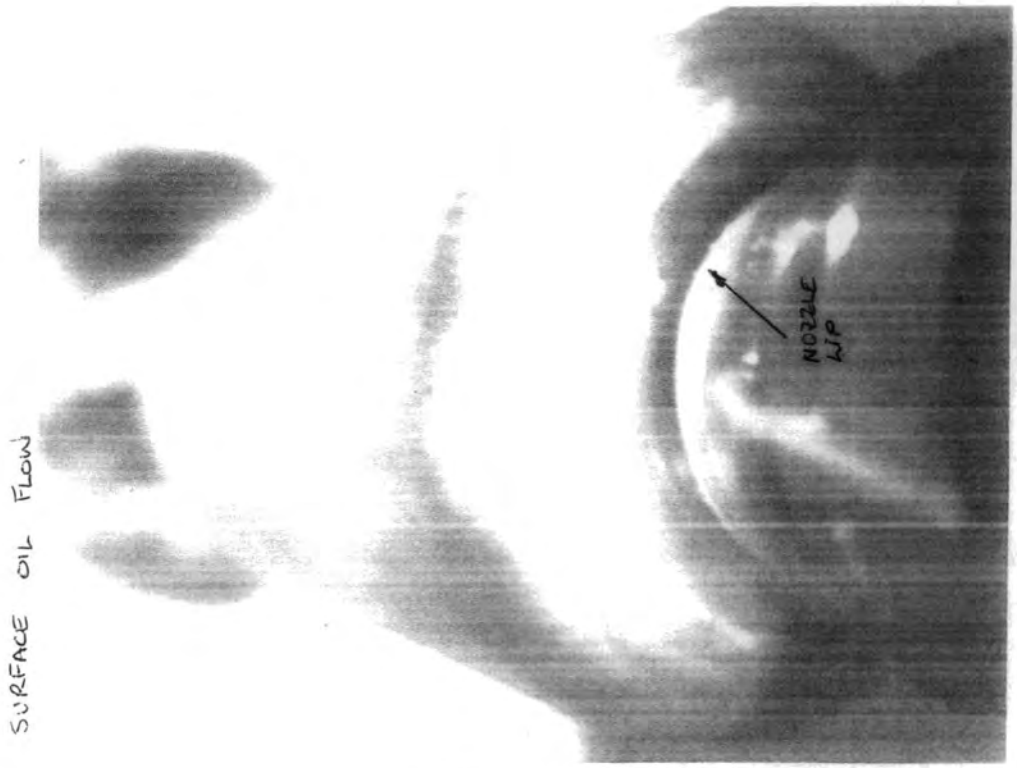


Plate 13b SLOT 3·33 STEP 0·00
C_{p_0} 0·174

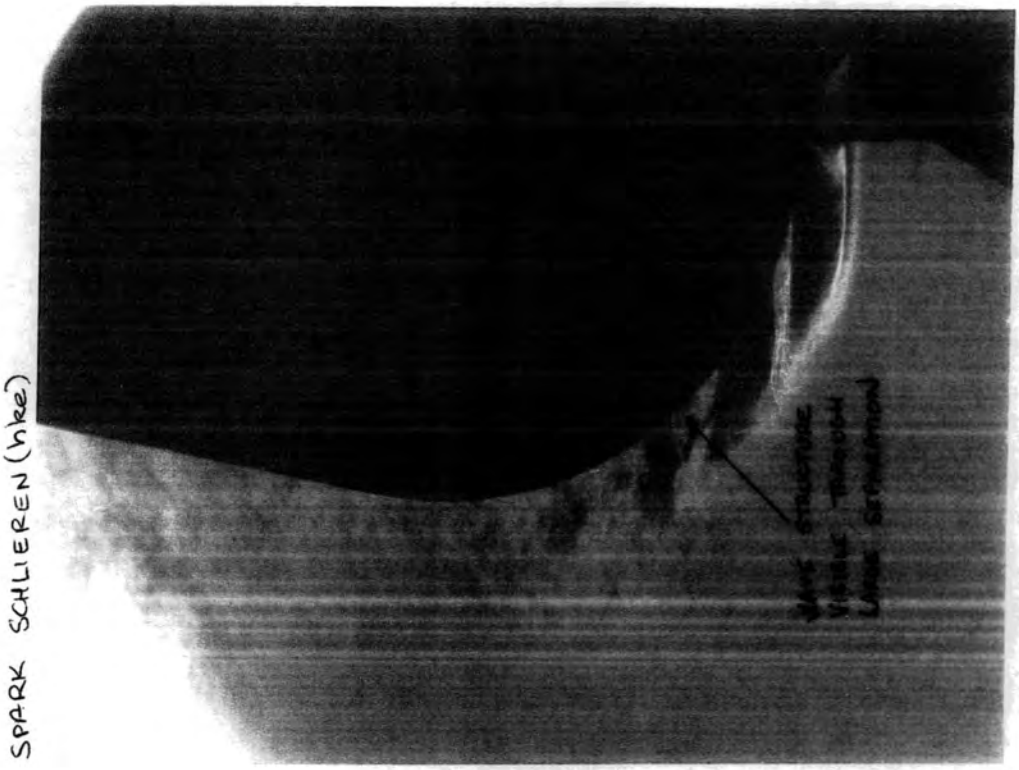


Plate 14a SLOT 3.33 STEP 0.00
C_{p_∞} 0.174

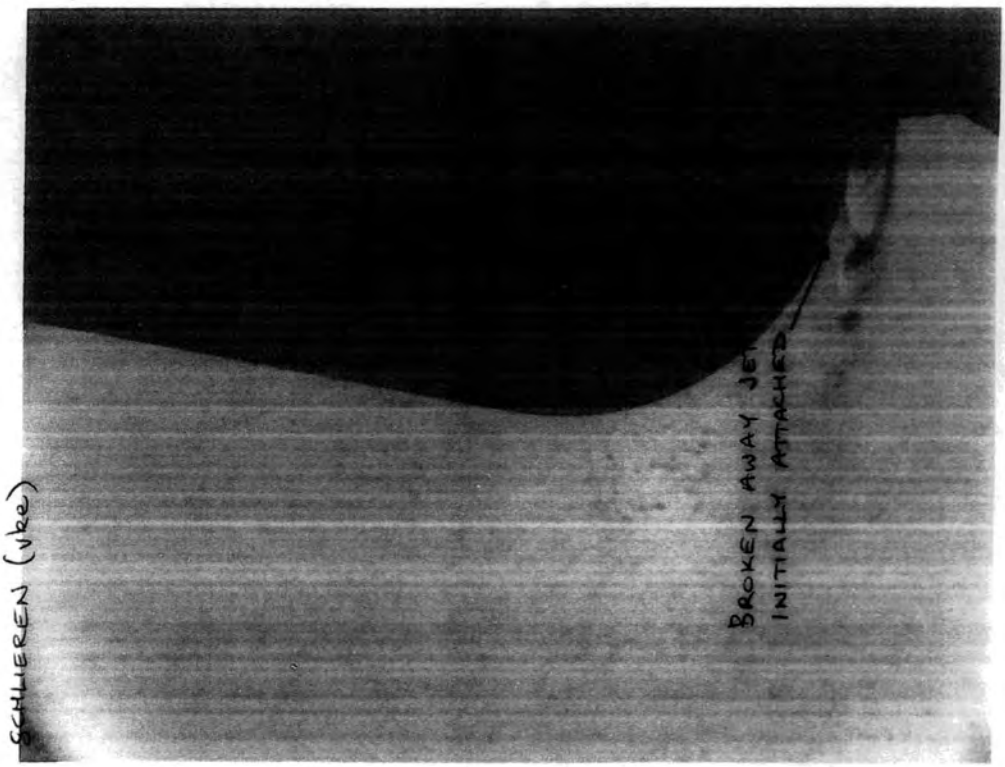


Plate 14b SLOT 3.33 STEP 0.00
C_{p_0} 0.243

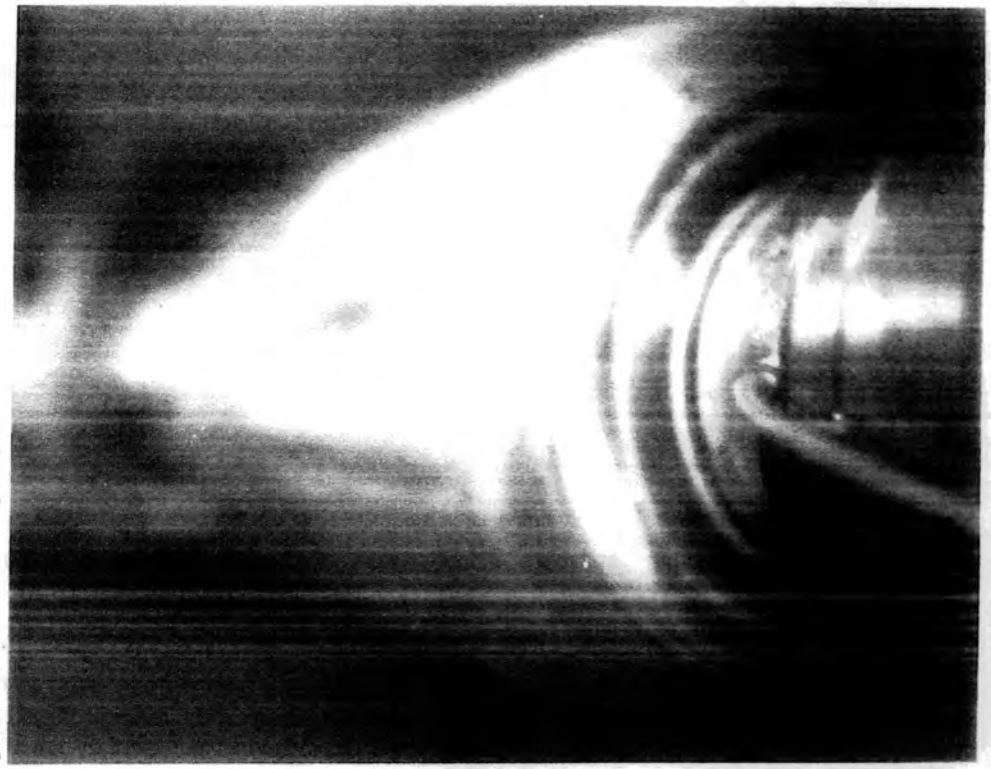


Plate 15a SLOT 3.33 STEP 1.25
C_{p_0} 0.209

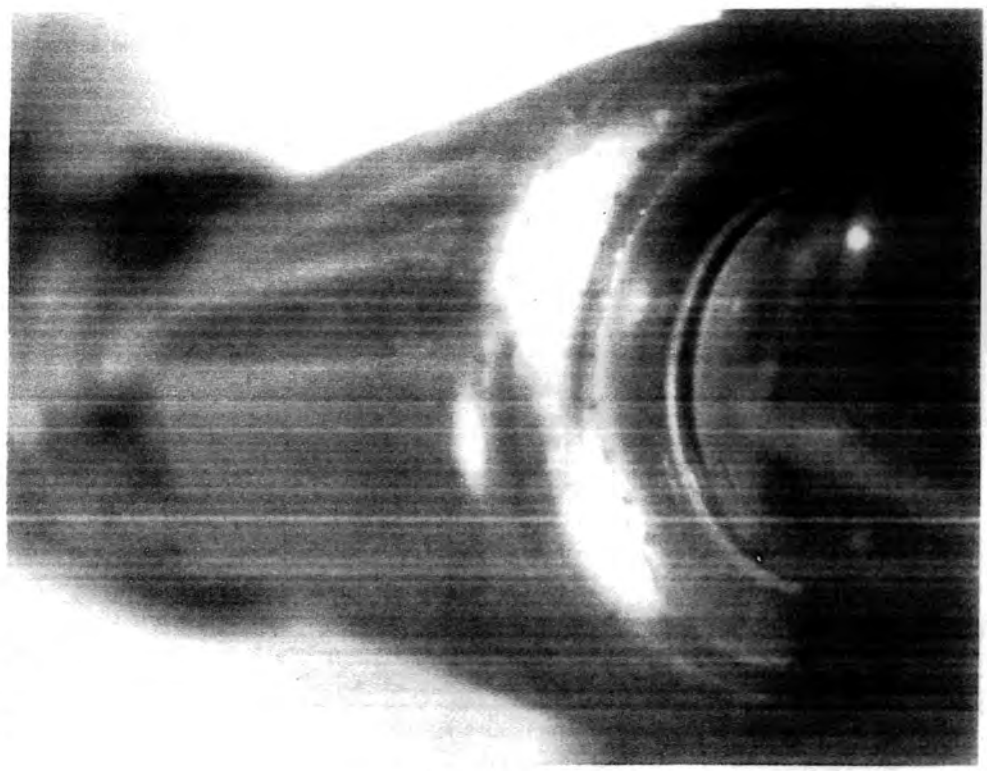


Plate 15b SLOT 3.33 STEP 1.25
C_{p_0} 0.174

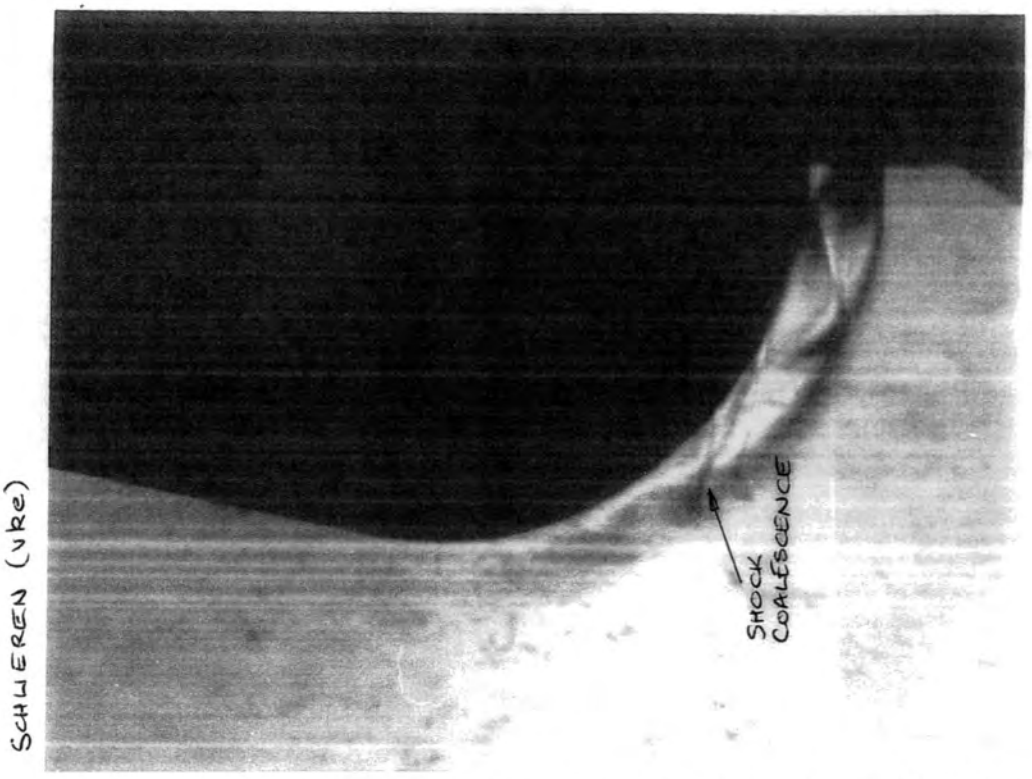


Plate 16a SLOT 3.33 STEP 1.25
C_{p_0} 0.157.

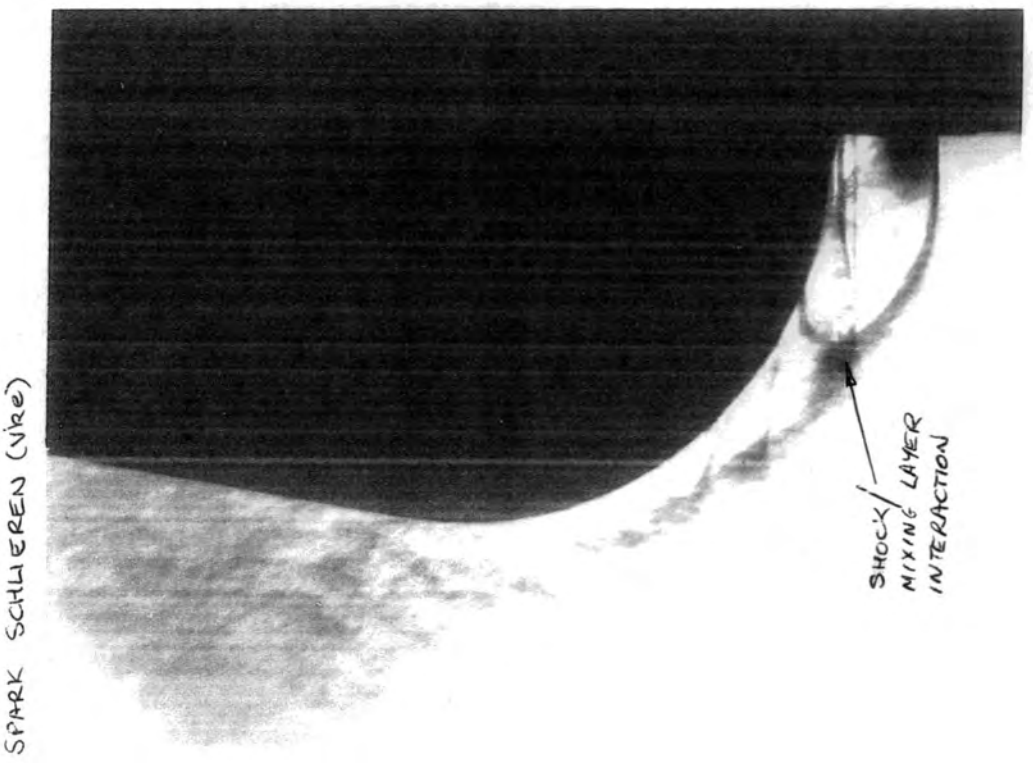


Plate 16b SLOT 3.33 STEP 3.13
C_{p_0} 0.159

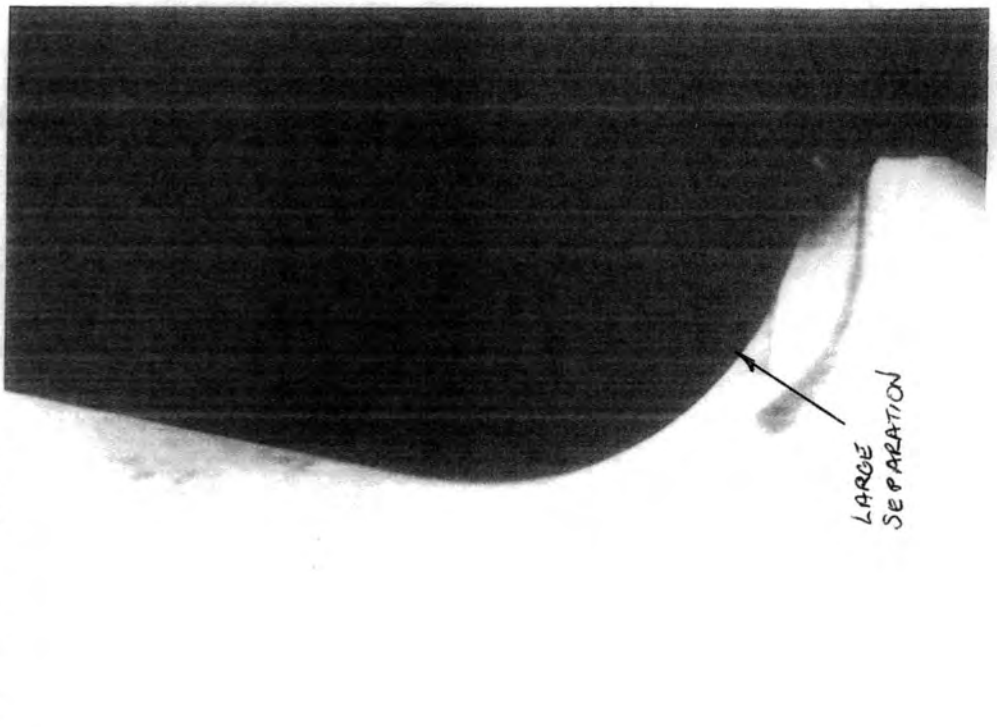


Plate 17a SLOT 5.00 STEP 0.00
C_{p_0} 0.225

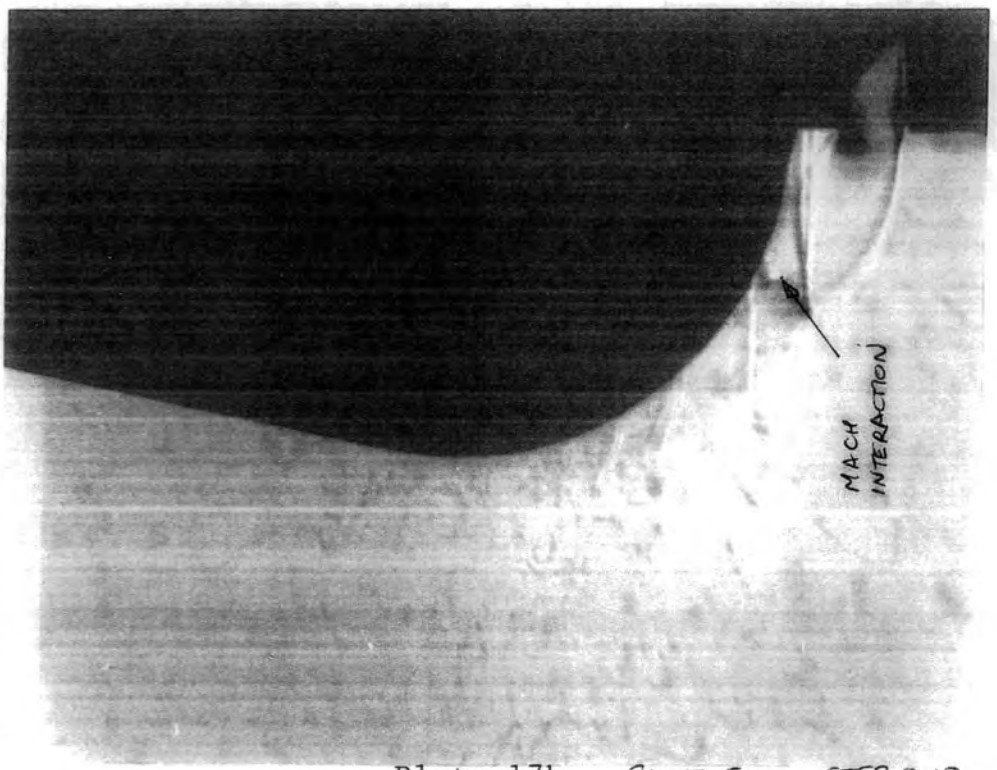


Plate 17b SLOT 5.00 STEP 3.13
C_{p_0} 0.222

Plate 18a SLOT 6.65 STEP 0.55
C_{p_0} 0.252

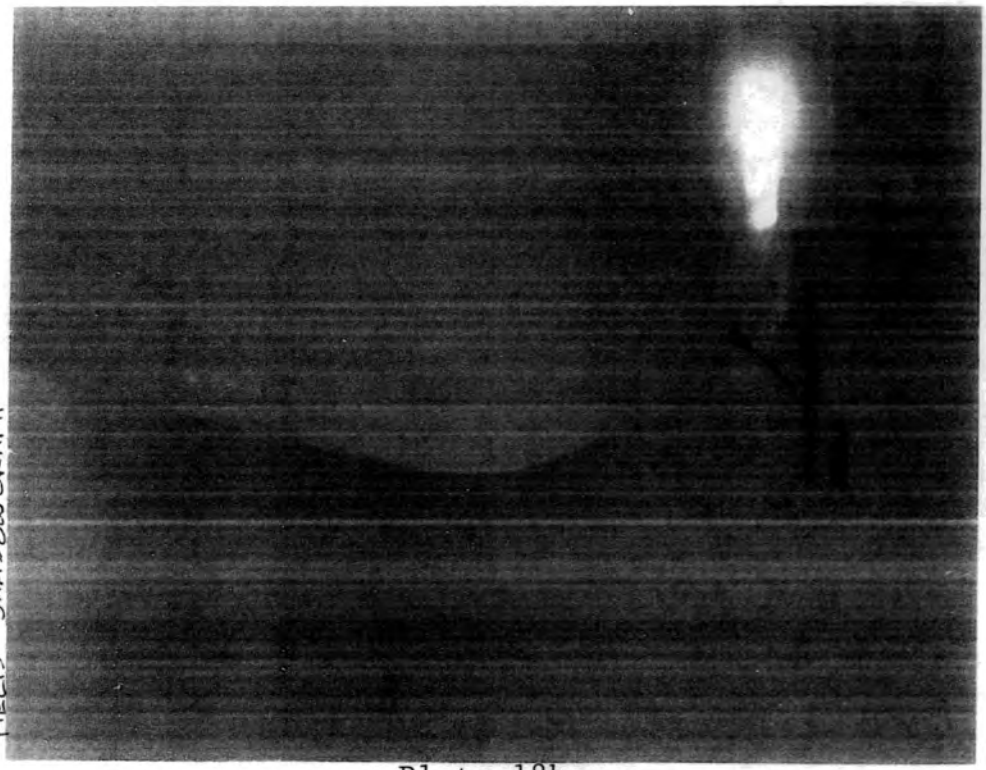
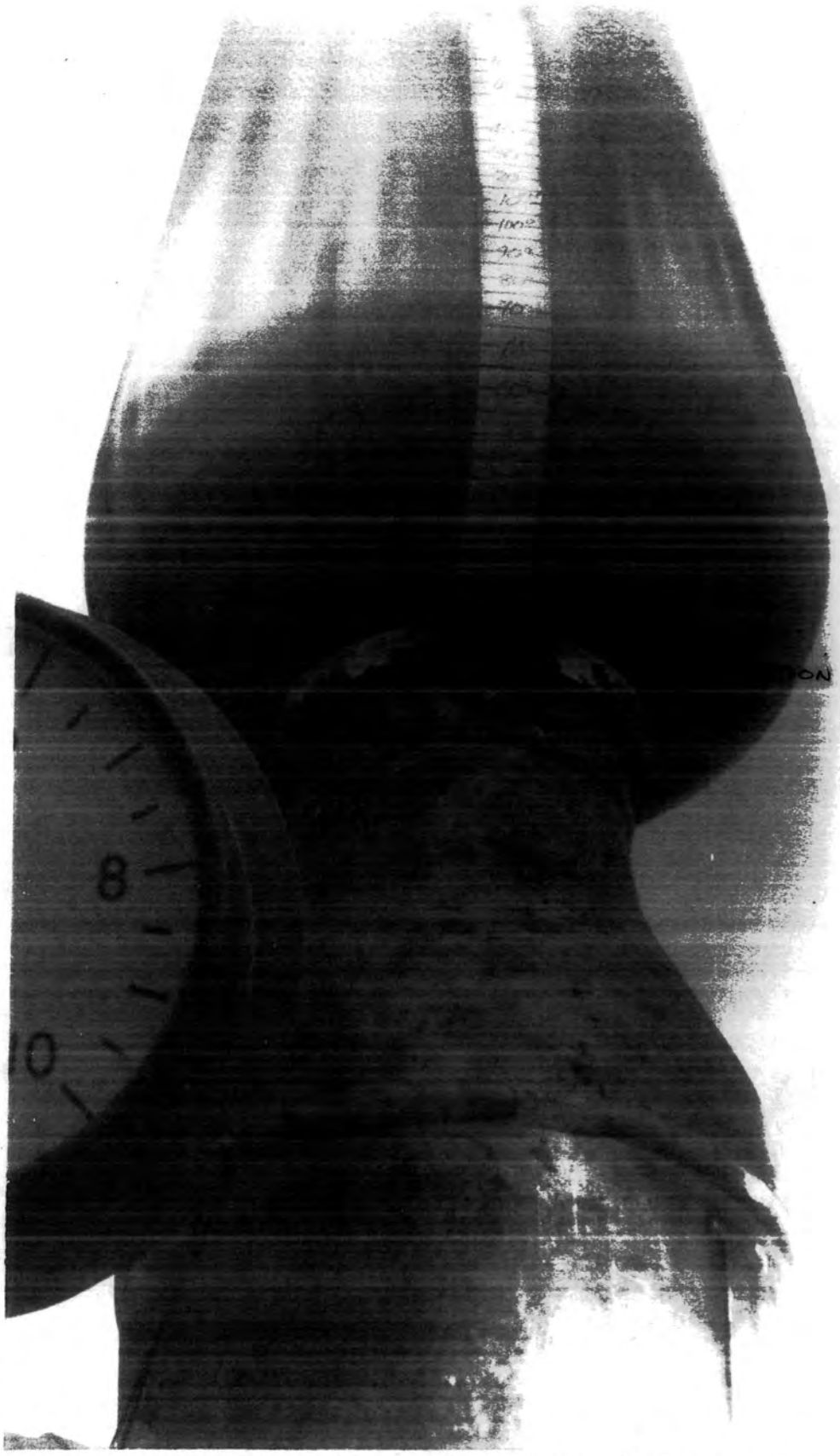


Plate 18b SLOT 6.65 STEP 3.60
C_{p_0} 0.184



FIELD SURFACE OIL FLOW

Plate 19 SLOT 6.65 STEP 3.60
C_{p_0} 0.184